Service Manual
Pulse Oximeter
Model 515

Aug 16, 1989

Part Number 9593-90-00

This manual applies only to
Model 515 monitors with
serial numbers starting
with the number 66.
(e.g., 66-xxxx)

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MANUAL REVISION HISTORY

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1.0 Theory of Operation

1.1 Introduction

The Novametrix Model 515 Pulse Oximeter is a non-invasive portable c meter designed to provide reliable continuous measurement, display, alerts for, oxygen saturation (SaO2) and pulse rate. The monitor can be p ered by AC line voltage or by its internal battery.

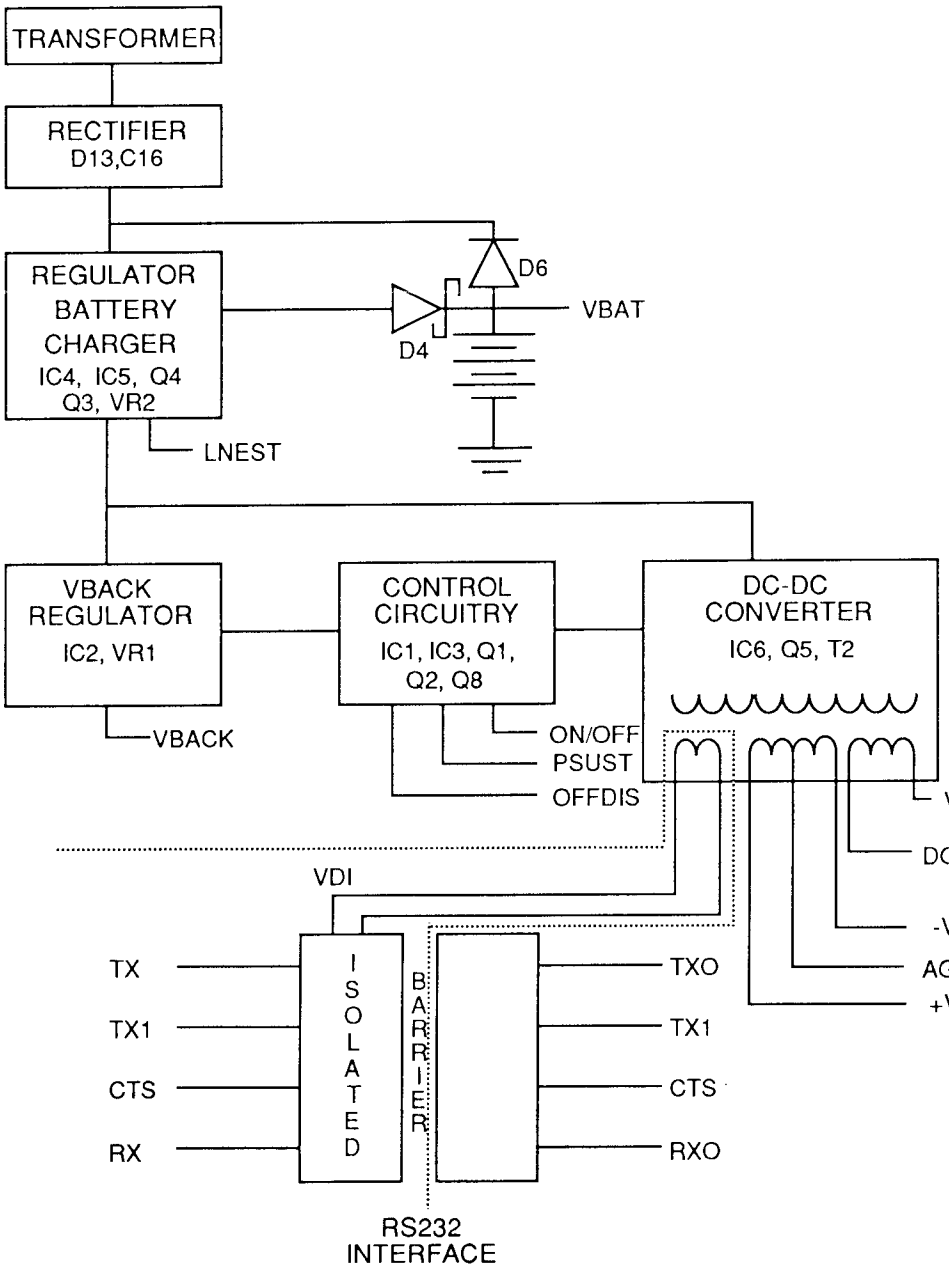
The Model 515 Pulse Oximeter utilizes sensors that contain two li emitting diodes (LEDs) and a photodiode. Each LED emits a specific p wavelength of light (660 and 940 nanometers) through a pulsating vasc bed to the photodiode. Because oxygen saturated blood absorbs differ amounts of light at each wavelength as compared to unsaturated blood, amount of light absorbed by the blood in each pulse can be used to calcul the ratio of oxygenated hemoglobin to total hemoglobin. This is displayed SaO2. Pulse Rate is calculated by measuring the time period between detec peaks of the waveform. The inverse of the time period, the frequency, is c played as Pulse Rate. The oxygen saturation measurement and the pulse r (beats/minute or bpm) are displayed on the monitor's Vacuum Fluoresc Displays and are updated once a second. Presence of a pulse is indicated v bly by a bar graph and audibly (user selectable) by a tone.

The Model 515 contains four main assemblies. These assemblies inclu the Power Supply Unit (PSU), the Digital Board, the Analog Board, and Bezel Assembly (which includes the VFD Display, and the Membrane K panel). The operation of each is discussed in detail in this section, referer the last section of this manual for the schematics and assembly drawings t correspond to each discussion.

1.2 Power Supply Board

Circuitry for mains or battery operation, turn on control circuitry, isolat supplies, and RS232 interface are contained in the power supply board. Ope tion of the power supply board can be easily described in a block diagram re

resentation as shown below, each block is described in detail. Reference pr
2503-01, 2503-03 to follow the circuit descriptions.



AC/BATTERY OPERATION

The model 515 monitor is capable of either AC mains operation, or op
tion from an internal battery. When the line cord is connected and the rear p
el power switch is on (| position) a green LED on the front pane
illuminated. This indicates that the AC portion of the power supply circuitr
powered and the battery is being charged. When the mains power is remo
the unit operates under battery power supplied by an internal lead acid

When the battery runs low a warning message is displayed which instructs reconnect the mains supply in order to recharge the battery. If the battery charges to a predetermined level (≈8 VDC) the unit will automatically turn self off to avoid damage to the lead acid cell.

1.2.1 Transformer and rectifier

When the unit is powered by AC (mains) the secondary voltage from power transformer is rectified by D13 and filtered by C16. Transistor Q4 is ased on, this powers IC4, a power switching regulator. This regulator is se 13.8 volts DC by VR2, it not only charges the battery while under AC (mai operation but also supplies power to the VBACK regulator. If the AC (mai is removed then the internal lead acid battery powers the monitor. With mains power diode D6 is forward biased, this enables the battery to power monitor. When AC is present D6 is reverse biased due to the fact that voltage on its cathode (approx. 22 VDC) is more positive than the voltage its anode (approx. 12 VDC). Therefore the battery receives only a charge v age from IC4 via D4, F1, and R14. Fuse F1 and resistor R14 are to protect battery from excessive charge currents. Diode D4 isolates IC4 and IC5 wh under battery power.

1.2.2 Backup regulator

Backup memory which is located on the digital board, and the control cuitry which turns the unit on, requires power even when the unit is off and connected to the AC mains. The backup regulator IC2 will have either + VDC (battery power) or +13.8 VDC (AC mains power) at pin 8, this is th regulated to +5 VDC by adjustment of VR1 and appears at pins 1 and 2 of IC This voltage powers IC1 and IC3 which control turning the unit on and off, it also run to the 2283 digital board via P401 pin 14 as VBACK which pow the backup memory.

1.2.3 Control circuitry

The operation of turning the unit on and off is done by IC1 and IC3, the ICs are constantly powered by either the battery or by mains regardless whether the unit is on or off. IC1 is a dual D flip-flop that is configured so th it's Q1 output (pin1) will toggle with each CLK (pin 3) pulse received. T CLK input to IC1 is driven by IC3 pin 3 which monitors the front panel **POWE** button (P401 pin 12). With each depression of the front panel **POWER** butt pin 3 of IC3 will pulse high, therefore pin 1 of IC1 will toggle from its previc state.

When the unit is off pins 12 and 13 of IC3 are high, therefore pin 11 is lo this keeps Q1 off which in turn biases Q2 off. With Q2 off IC6 receives no po er so the DC-DC converter is inoperative. By pressing the **POWER** button p 1 of IC1 will toggle low, this brings IC3 pin 11 high, Q1 is turned on biasing

on. With Q2 on IC6 is powered up and the DC-DC converter turns the mo on.

Pressing the **POWER** button again will turn the unit off by causing IC3 p to pulse high which toggles pin 1 of IC1 high. Pin 11 of IC3 will go low tur the unit off, provided pin 12 is high via IC3 pin 10. If the OFFDIS line from processor is high then the monitor will not shut off until this line is bro low. The reason for this is to ensure that power remains while the process writing to memory.

The PSUST line informs the digital board the status of the DC-DC con er, IC3 pins 5 and 6 are tied to the gate of Q1 which goes high while the ur on, C5 will charge up through R11, therefore IC3 pin4 will go low. Once unit is turned off C5 quickly discharges through D1, then IC3 pin4 (PSU goes high.

1.2.4 Switching regulator, DC-DC converter

Power for the remaining boards in the monitor, and the RS232 interfac generated by a switching regulator that is configured as a DC-DC conve When the unit is turned on IC6 is powered up, this is a current mode p width modulator which drives the primary winding of transformer T2 via The N-channel MOSFET Q5 is pulsed by IC6 pin 6, the switching frequenc approximately 18 KHz, with a 10% duty cycle (≈5 µsec) (the duty cycle vary with load requirements).

There are three secondaries on T2. The +5 volt digital supply is gener from pins 5 and 6, rectified by D9 and filtered by C22, C14, and L2. Resis R29, R39, R33 and potentiometer VR3 act as feedback for IC6 enabling output to be adjusted and regulated for + 5VDC. Dual analog supplies are erated at pins 8 and 9 with pin 10 as the center tap (AGND). Diodes D7 D8 rectify the secondary voltage and C10, C11, C13, and C15 filter the ou An isolated supply is generated at pins 2 and 3 for the RS232 interface cir ry.

1.2.5 RS232 interface

The RS232 interface is isolated from the rest of the circuitry, an isol +5VDC supply is generated by the DC-DC converter, and information to from the microcomputer is handled by four opto-isolators. Pins 2 and transformer T2 are rectified by D11 and filtered by C23, IC7 is a +5 regulator for the isolated portion of the RS232 interface circuitry.

The 25 pin D connector on the rear panel is used for the RS communication, information from the D connector is run to IC8 w translates the incoming RS232 levels to 5 volt logical levels. There are lines which are transmitted from the microcomputer and are handled by

(TX0) and IC10 (TX1). The TX0 information is run to pin 11 of IC8, information is run to pin 10 of IC8 and to pin 19 of J102 (25 pin D connecto the rear panel). The TX1I2 signal at pin 19 of J102 is a 0-5 volt level si which is dedicated to communicate with the Analog Output Module section 7.4). The outputs of IC8 pin 14 (TX0) and pin 7 (TX1) are transl to ±10 volt levels.

There are two receive lines, RX and CTS. These signals are taken in f the D connector and run to pins 13 (RX0) and 8 (CTS) of IC8, where they converted to 0-5 volt levels. The outputs at pins 12 (RX) and 9 (CTS) d transistors Q6 and Q7 respectively. These transistors drive the LEDs of I and IC12, the signals are transmitted across the barrier and run to P401 (CTS) and pin 6 (RX) where they are received by the processor.

1.3 Digital Board #2283

The processor which controls the monitor along with all of its support cuitry is contained on the digital board. All of the timing for the 2288 Ana board is generated on the 2283 Digital board and is buffered before transm sion to the Analog board through J104.

1.3.1 Microprocessor

The processor used is an HD64180, 8 bit, CMOS microprocessor (IC The clock circuitry consists of C1, C2, and Y1 which develops 9.216 MHz tween the XTAL (pin 2) and EXTAL (pin 3) inputs. This crystal frequenc divided in half (4.608 MHz) and is used to generate the timing for the front board and the clocking for the tone generator.

The processor is reset at power up by C3, R3, and D3 which drive schm inverter ICG2 pin 3. The time constant of C3 and R3 will reset the proces after approximately 90 msec, D3 will prevent any negative spikes during po er down.

There are two asynchronous serial communication interface channels. first (channel 0) is configured for 2 way communication using TXA0, RX and CTS0, the second (channel 1) is configured for transmission only TXA1. The transmit pins TXA0 (pin 45) and TXA1 (pin 48) are buffered transistors Q1 and Q2 respectively. The outputs from the transistors drive to isolators located on the power supply board, this is done to isolate the m itor's internal circuitry from the RS232 output. When the CTS0 is high no d is transmitted from TXA0, when it is low data can be transmitted.

1.3.2 Memory

The Erasable Programmable Read Only Memory (EPROM) is a 27C (IC3). The ME (Memory Enable) and RD (Read) lines are ORed through I

pins 4, 5, 6 which drive the IC's OE (Output Enable) line during a CPU
cycle. The CE (Chip Enable) line is tied to address line A17, this will en
the line (active low) in the address range of ØØØØH to ØFFFH. Provis
have been made to enable the use of a 27C101 (1Mb EPROM) by bringing
dress line A16 to the EPROM socket. This would have the address range f
ØØØØØH to 1FFFFH.

The Random Access Memory (RAM) consists of two HM62256 (
IC6), the OE (Output Enable) and WE (Write Enable) lines are commo
both RAMs. The OE lines are tied together with the EPROM's and there
is activated in the same way. The WE lines are enabled by the ORed resul
the ME (Memory Enable) and WR (Write) lines of the CPU, this ensures
the ICs will be written to only at CPU memory write cycles. The address
coding for the CE (Chip Enable) lines is handled by logic circuitry. The
line is inverted by ICG2 pin 10 then ORed with the A15 line by ICG1 pins
10, then it is ORed with the inverted A15 line (ICG2 pin 8) by ICG1 pins
12, 13. This produces the CSM1 (Chip Select Memory 1) and CSM2 (Chip
lect Memory 2) lines, when A17 is high and A15 is low CSM1 will be sel
ed, when both A17 and A15 are high CSM2 will be selected. The add
range for IC4 is 2ØØØØH to 27FFFH, for IC6 it is from 28ØØØH to 2FF
The decoded CE lines (CSM1 and CSM2) are then individually ORed with
other signal at IC5 pins 8, 9, 10 and IC5 pins 11, 12, 13. This signal is the
sult of ORing the PSUST (PSU STatus), which is low when power is on
high when the unit is off, and the RSTDSL line which is high on reset only
pins 1, 2, 3). As IC5 is powered from the VBD supply (derived from
VBACK supply) it ensures that the CSM1 and CSM2 lines are inhibited f
activating the CE lines on IC4 and IC6 when the power is off and during re
This avoids data corruption in the RAMs.

1.3.3 Real Time Clock (RTC)

The Real Time Clock (RTC) is IC7 an HD146818 RTC chip, its CE (C
Enable) line is driven by ORing the PSUST, RSTDSL at IC5 pins 1, 2, 3
the RTSO line at IC5 pins 4, 5, 6. The RTSO is a latched output from the C
the IRQ (Interrupt Request) pin 19 of IC7 is connected to the INT2 line of
CPU, this is a low priority interrupt source. The RES pin of IC7 is connecte
the RESOUT line to ensure that the RTC does not generate any interrupts
power up.

The RTC has an internal multiplexed address and a bi-directional data
which is controlled through the R/W (Read/Write), AS (Address Strobe),
DS (Data Strobe) pins. When R/W, CE, DS inputs are low the address
pearing on the data bus is latched on the negative transition of the AS pin.
ta is written to the device in the same way except the AS pin is held low
the data is latched on the negative transition of the DS pin. When reading
the R/W pin is high and the data is read by the CPU just before the nega

transition of the DS pin. The R/W pin of IC7 is connected to the WR pin of CPU, it is low during write cycles and high during read cycles.

The decoding for the AS and DS lines are handled through logic circ The inverted E line (synchronous clock output) is ORed with the IOE (In Output Enable) at ICG3 pins 1,2 to produce a signal which controls the tin of the AS and DS signals. This output is NORed with the Y1 output of IC and the AØ line at ICG4 pin 10 for the AS line and is active in the add range 8ØH, 82H etc. (when AØ is low). The DA line is the NORed resul the Y1 of ICG15 and the inverted AØ line which appears at ICG4 pin 9, th active in the address range 81H, 83H etc. (when AØ is high).

The timing is achieved through C5, C6, C7, R5, R6 and Y2 which form oscillator circuit. This provides the RTC with a clock signal from which ac rate time can be continually kept. The RTC is powered by the VBD (bac voltage) supply which keeps the correct time while the monitor is off. If VBD is removed or fails the PS pin (pin22) senses this through R4, C4, and the time will not be used since it is invalid.

1.3.4 Tone Generator Circuit

The tone generator circuitry is based on the SN76496 tone gener (IC8). The volume and frequency output is programmed by sending coded d to IC8's data inputs D7 - DØ through the CPU data bus. When the CE (C Enable) and WE (Write Enable) pins are low data is read from the data by IC8. This process takes longer than the standard CPU write cycle so READY line from IC8 is tied to the CPU's WAIT line. When IC8 is reac data the READY line is brought low, this will cause the CPU to pause in current state and hold the data on the data bus. When the data has been r the READY line will return high and the CPU will operate as normal. The and WE pins are tied together and are active low, this signal SGCS (So Generator Chip Select) is derived by ORing the CPU WR line and the Y2 o put from ICG15 at ICG3 pins 8, 9, 10.

The 4.608 MHz clock signal is divided in half by ICG10 pin 6 and is c nected to the CLK input on the tone generator. This frequency is divided do by the tone generator to obtain the desired output frequency. To prevent random noise from being generated on power up the output from ICG10 is hibited by the RESET line which is connected to ICG10's C (clear) input. T will prevent clock signals to IC8 for the duration of the reset signal.

The AUDOUT pin from IC8 is decoupled by R7 and C8 to prevent osci tions. The output is then AC coupled through C9 and fed into IC9 which is watt audio amplifier. The output from IC9 pin 5 is AC coupled through two pacitors* in parallel to J401 pin 19 which with J401 pin 20 is run to the spea which is mounted on the unit's chassis.

*On rev 00 boards they are C12A and C12B, on rev 01 boards they are C13 and C14.

1.3.5 VFD Interface

Communication between the VFD (Vacuum Fluorescent Display) and CPU occurs at J403, there are two control lines (WRDSP and PROBUS) al with the CPU data bus DØ-D7. The WRDSP line controls the programmin the display, when this line is low (ICG3 pin 6) the data on the data bus is r by the display module. The PROBUS is then brought low by the display m ule while it processes the information sent to it. This line is read by the C via ICG18 before any data is sent to the display, if the line is low no data be sent, it will be checked until it is high which indicates data can be sent.

The LNEST line (Line Status) indicates whether the monitor is running of the line supply or off of battery power. When this line is high the monitc hooked up to the mains supply and a green LED on the front panel is illumi ed. LNEST is also connected to A7 of ICG18 so the CPU can read the st of this signal. The RESET line is brought to the display module to blank display during power up.

1.3.6 Keypanel Interface

The keypanel interfaces with the CPU via connector J2. All of the keys the front panel are momentary normally open switches which short to gro upon depression (J2 pin 1). The inputs from the keypanel SW1-SW6 are h high by resistor pack RPG1 and feed ICG18, with the exception of ON/C key which goes directly to the power supply board to turn the unit on and off.

1.3.7 Front End Timing

All of the timing waveforms for the 2288 front end board are derived fr the logic circuitry on the 2283 digital board. The CPU clock line (CLK) is di ed in half by ICG10 to produce a 2.304 MHz signal. The next stage divi that signal by 50, this is done by ICG13, ICG8 and the other half of ICC The negative edge of the 2.304MHz signal increments ICG13, when Q1, Q6 are all high (occurs after 49 counts) pin 8 of ICG8 will go high. This sig appears at the "D" input of ICG10 pin 12 and is transferred to the RESET on ICG13 on the next positive going pulse of the 2.304 MHz signal (ICG10 11). This will reset ICG13 causing the Q1, Q5, Q6 outputs to reset to "0", output of ICG8 pin 8 will go low, and this low will be transferred to the RES pin of ICG13 (on positive clock signal to ICG10) enabling it to begin coun again. The resulting output is 49 clock cycles + 1 clock cycle during reset wh gives the required count of 50, the output frequency is therefore 46.08 KHz.

The 46.08 KHz signal drives ICG14 which is negative edge triggered. A two pulses the Q2 output of ICG14 will go high, this will cause ICG11 pin 9 reset ICG14 on the next positive edge, this sends the Q2 output low. The set signal will be removed on the next positive edge and incrementing will p ceed on the following negative edge, this results in a pulsed output at ICC

pin 9 of 15.36 KHz. This 65.1µsec pulse drives ICG16 which sends each o outputs high sequentially from Q0-Q9 with each input pulse, then continu recycles. This results in each Q output of ICG16 producing a positive g pulse of 65.1µsec every 651µsec.

The Q0 and Q5 outputs are inverted by ICG7 pins 2 and 4, these out drive the red and infrared LEDs on the front end board (LED1 and LI lines). The Q0 and Q5 lines are NANDed together with the Q1 output f ICG14 and outputs appear at ICG6 pins 6 and 8. This results in a nega pulse of 21.7µsec which occurs in the middle of LED1 and LED2 signals. Q3 and Q8 outputs of ICG16 are ORed at ICG5 and the result is inverted ICG7 pin 6, this signal drives the shorting FETs on the front end board (I This signal turns the grounding FETs on the front end board on before e LED drive signal. The Q3 output from ICG17 is also ORed with the Q3 and outputs of ICG16 at ICG5, this is done so that the FZ line can be overrid and held on for front end calibration purposes.

1.3.8 Front End Board Interface

The Electrically Erasable Programmable Read Only Memory (E^2PROM controlled through ICG17 and half of ICG20. The EESK (EEPROM Se Clock), EECS (EEPROM Chip Select) and the EEDI (EEPROM Data lines are programmed by ICG17 and the EEDO (EEPROM Data Out) is r at bit 0 of the data bus by ICG20. The SA1 and SA2 lines are controlled ICG17, these lines demultiplex the red and infrared AC signals, and discha the AC coupling capacitors (FILTIN line) on the front end board.

One half of ICG20 reads data from the front end board, it reads the EI ROM's data out line and the red and infrared status lines (STLED1 STLED2). The other half is used as a static address bus to the front board, this is used to reduce noise generated by the CPU's address and d busses on the front end board. It works in such a way that the DPØ-DP7 APØ-AP2 lines are always at a high impedance state and the PWR line is ways at a logic high unless these lines are actually being used to transfer d to or from the front end board. All of the front end peripherals are within the dress range of AØ-B1H as shown in the following table.

Address	I/O E	WR	RD	E	Name	Function
8Ø-87	Ø	Ø	X	X	WRDSP	Display Module Write Enable
88	Ø	X	X	1	AS	RTC Address Strobe
89	Ø	X	X	1	DS	RTC Data Strobe
90-97	Ø	Ø	X	X	SGCS	Sound Generator Chip Select
90-97	Ø	X	Ø	X	----	Led Status/EEPROM O/P (ICG20)
98-9F	Ø	X	Ø	X	----	8 bit I/P port (ICG18 enable)
98-9F	Ø	Ø	X	X	----	8 bit latch (ICG17 enable)
AØ-A7	Ø	X	X	X	----	Clear INTØ interrupt
AØ-A7	Ø	Ø	X	1	WRADC	Start conversion ADC ch1-8
AØ-A7	Ø	X	Ø	X	RDADC	Read ADC ch1-8

AØ-B7	Ø	X	X	X	----	Static addr bus enable (1/2 ICG2(
AØ-B7	Ø	X	X	X	----	Static data bus enable (ICG19 enb
AØ-B7	Ø	Ø	X	1	PWR	Static WR line
A8-AB	Ø	X	X	X	CSGAN	Gain/offs DAC chip select
AC-AF	Ø	X	X	X	UPOFF	Gain/offs DAC output update enb
BØ-B1	Ø	X	X	X	CSLED	LED drive DAC chip select

(Ø-logic low; 1-logic high; X-don't care)

The Y4, Y5, Y6 outputs of ICG15 that correspond to I/O addresses for LED drive DAC, the gain/offset DAC and the ADC are NANDed at ICG6 1, 2, 13, the output is then inverted by ICG7 pin 11 to produce a signal controls the enable pins of ICG19 and half of ICG20 (this allows data from address and data busses to be transferred). This signal is also ORed with CPU's WR line and inverted E line at ICG9 to produce the PWR (static line) when writing data to the front end. The direction of the data flow is trolled by connecting the CPU's RD line to the DIR line of ICG19. When RD line is low (CPU read cycles) the data flow is from the B to A pins ICG19, when RD is high data flows in the opposite direction.

1.4 Analog Board #2288

The drive circuitry for the REDLED and IRLED along with the detec and decoding circuitry is found on the 2288 analog board. The processor c municates with the analog board through a 40 conductor ribbon cable locate E1. All the timing signals and power lines are run through the ribbon cabl well. The sensor connects to the analog board at J405 and is run to the f panel connector by a cable assembly.

1.4.1 Probe Detection

The monitor recognizes that a probe is connected by monitoring pins 5 6 of J405 (REDLED and IRLED cathodes). A dual comparator IC23 has positive inputs tied to 1/2 VLED (≈2.4 VDC). The negative inputs of IC23 tied to the REDLED cathode (pin 2) by R64, and to the IRLED cathode 6) by R65. Resistors R66 and R67 hold the negative inputs low when no pr is connected. When the probe is connected both pins 2 and 6 are brought h which brings the outputs of both comparators low. When the probe disconnected pins 2 and 6 are at ground potential and the outputs are high to pull-up resistors R48 and R47. This will signal the processor to flas "CONNECT 87XX PROBE" message on the display.

If either of the LEDs malfunctions and causes the output of a comparato remain high while the other goes low then an error message will be displa A malfunction with the IRLED will flash "PROBE ERROR-Ø4", a malfunc with the REDLED will flash "PROBE ERROR-Ø2". The point of pins 3 and IC23 is also monitored by the A/D converter IC11, if IC24 were to malfunc or if F1 were to blow then "MONITOR ERROR-ØØØ1" would be displayed.

Resistors R66 and R67 along with C34 and C35 form low pass filters to ter out any noise that may falsely trigger the comparators.

1.4.2 Power Supplies

Three separate voltages are run to the 2288 analog board. A digita 5VDC (VDD) and dual 12 volt analog supplies (+VA, -VA). The dig ground (DGND) and the analog ground (AGND) are connected at only point which is at IC11 pins 8 and 28. The dual analog supplies (+VAF, -V are filtered by L2, L3, C90, and C91, these supply most of the analog circu on the board with the following exceptions.

Voltage regulator IC19 develops +5 volts (+5VA) from the +VAF sup this is for IC12 which drives the inputs of IC11, this is done in order to prev over voltage damage to the inputs of IC11.Voltage regulator IC24 develops volts VLED and VOPP from +VA. The VOPP voltage is taken directly fr the output of IC24 and powers IC23 (LM393 dual comparator). The VLED used as the power supply for the RED and IR LEDs. Fuse F1 protects aga short circuits or excessive power consumption by the LEDs, L1 and C38 fi the output from high frequency noise created from the fast switching of LEDs. The dual analog supplies +VAF and -VAF are further filtered by R C96 for +VA21, and R75, C97 for -VA21 to power IC21 which handles the c ical front end circuitry.

1.4.3 Reference Voltages

There are two reference voltages on the 2288 analog board. A -1.23 V potential is created by D5 and R24, it appears on pin 5 of IC15. This amplified by IC15 pin 7 with a gain of 3.42 created by R25 and R28, appears as -4.2 VDC (VREF-). Capacitors C17 and C18 help stabilize reference voltage, C21 is used to filter noise from the output of IC15 pin 7. negative reference voltage (VREF-) is applied to IC15 pin 2 which configured as an inverting unity gain amplifier (R26 and R27 set the gain to therefore +4.2 VDC appears at pin 1 of IC15 (VREF+).

1.4.4 E^2PROM

The electrically erasable programmable read only memory (E^2PRO IC10 is used to store offset values for the Ir and Red channels obtained dur a factory front end calibration. It also stores factory programmed battery mo toring voltage values. This device can store 64 separate 16 bit values, it is p grammed serially through pins D1 (Data In), CS (Chip Select), SK (Se Clock), and DO (Data Out).

The device is selected by bringing the CS line high, then the first three b on the DI line indicate the function required (read, write, or erase). Once function is determined the next six bits indicate the address of the operati

(ØØH - 3FH). If writing then the next 16 bits sent is the value to be sto the CS line is taken low then high and the DO line is scanned until a high l is read. This indicates that the data has been received and the next opera can begin. If the read operation was selected the data would be present at DO line once the address was sent.

1.4.5 LED Drive circuitry

The intensities of the REDLED and IRLED are controlled by the proce through the use of IC20, an 8 bit dual digital to analog converter (DAC). "A" DAC corresponds to the REDLED and is selected when pin 6 is (DACA). The "B" channel corresponds to the IRLED and is selected bringing pin 6 high (DACB). Steady state DC output voltages which repre the digital inputs are developed at IC22 pin 1 for the REDLED and IC22 p for the IRLED. Because both DACs use the same reference voltage (VRI the output voltage swing from ØØH to FFH is the same for each (0 - +4. VDC).

The voltages that drive the LEDs are pulsed, this is controlled by I pins 9, 10, and 11 for the REDLED, and pins 14, 15, and 16 for the IRL When IC25 pin 9 goes low the switch between pins 10 and 11 is closed. voltage at IC22 pin 1 is now present at IC25 pin 10 until pin 9 goes high. pulsing is controlled by the LED1 line. The same applies for the IRLED ch nel, when pin 16 of IC25 is low the switch from pins 14 to 15 is closed and voltage at IC22 pin 8 is present at pin 15 of IC25. The IRLED pulsing is trolled by the LED2 line. Resistors R53, R54, R55, and R56 form a voltage vider for each channel to bring the maximum pulse voltage down from 4.1 to 1 volt.

The pulses at the voltage divider of R53 and R55 drives pin 5 of IC22 wh with pins 6, 7, and Q7 is configured as a unity gain amplifier. The voltage appears at pin 5 of IC22 will appear at the junction of R60 and the emitte Q7, the maximum of which will be 1 volt. Since the collector of Q8 is tied to cathode of the REDLED, when Q7 is pulsed by IC22 pin 7 the REDLED conduct. Resistor R60 limits the current through the LED to 303 mA volt/3.3Ω). Diode D7 is used to limit any negative offset that may be in duced by IC22 to -0.7 volts. Pins 12, 13, 14 of IC22 and Q8 form the unit amplifier for the IRLED channel. The operation of the circuit is the same as the RED channel. Resistor R61 limits the current through the IRLED to mA (1 volt/5.6Ω) and D8 protects against any negative offset.

1.4.6 Photodiode Return Path

The photodiode in the sensor is connected to pins 9 and 10 of IC21 whic configured as a current to voltage convertor. When light strikes the photodi it induces a small current to flow from anode to cathode, this creates a cur flow into pin 10 of IC21 (non-inverting input). This current flow will produc

output voltage at pin 8, the output voltage corresponds to the induced cur multiplied by the combined resistance values of R57 and R58. Capacitor acts as a high frequency filter for the output of IC21 pin 8.

A two pole high pass filter consisting of IC21 pins 5, 6, and 7 allow 1.536 KHz frequency to pass and limits any 50 - 60 Hz noise, these bre point frequencies are controlled by R46, R50, R52, C36, and C37. Resis R45 and R49 set the gain to 10. Resistors R51 and R69 along with FETs and Q10 are turned on between each pulse by the FZ line to ensure the sig is at ground potential before receiving a new pulse.

A second two pole high pass filter IC21 pins 1, 2, and 3 further reduce low frequency noise. The gain is set to approximately 1 by R40 and R41, I is connected to VREF- and gives the output about 60 mV offset to ensure output never goes negative. Resistors R42 and R43 along with capacitors C and C33 set the break point frequency. As in the previous stage the signa brought to ground potential in between the signal pulses, this is done by R R68, Q3, and Q6 via the FZ line.

The output of the second high pass filter is limited to a maximum outpu ≈4.8 volts by IC21 pins 12, 13, and 14 along with R39 and D6. The VREF+ is connected to IC21 (pin 12) which is configured as a unity gain amplifier, ensures that the output (pin 14) sits at +4.104 volts DC. The cathode of D6 so sits at +4.104 VDC. When IC21 pin 1 drives the junction of R39 and D6 4.7 volts, the anode of D6 will sit approximately 0.6 volts above the cath and begin to conduct, this limits the output.

1.4.7 Signal Demultiplexing

The signal that appears at the junction of R39 and D6 contains both and Ir information, this signal must now be demultiplexed for analyzation the A/D converter IC11. There are four separate signals which have to be s arated; red DC, Ir DC, red AC, Ir AC. The two analog switches of IC17 (p 1, 2, 3 and 6, 7, 8) are controlled by the SH1 and SH2 lines from the dig boards. When the red pulse is present, pin 1 of IC17 is brought low by S closing the switch between pins 2 and 3. This enables the pulse to charge pacitor C29, when the switch is opened capacitor C29 holds the value tha was charged to. This voltage is amplified by IC18 (pins 12, 13, 14) which configured as a unity gain amplifier. The combination of IC18 (pins 12, 13, 1 C29, and IC17 pins 1, 2, 3 form a sample and hold circuit that demultiple the red DC signal at IC18 pin 14.

The same procedure is followed for the Ir signals. When the Ir pulses present pin 8 of IC17 is brought low by SH2, this enables C30 to charge up a the corresponding Ir DC signal is present at IC18 pin 8. The DC signals read by channels 3 and 5 of the A/D converter IC11 at pins 11 and 13.

The red and Ir DC signals also feed low pass filters, the red signals handles by IC18 pins 1, 2, 3 and the Ir is handled by IC18 pins 5, 6, 7. The ters are configured for a gain of 1 at 1 Hz and dropping off the 0.7 at 10 Hz breakpoints are controlled by C25, C27, R35, R37 for the red signal, and C28, R36, R38 for the Ir signal. The red and Ir AC signals are developed by tecting the change in the DC signals, this is done through AC coupling har by C23 (red) and C24 (Ir).

After the AC coupling the two signals are buffered. The red AC sign buffered by IC15 (pins 8, 9, 10). The input to this buffer is switched to gr by the FILTIN line going low. This closes the switch between pins 2, IC25 which shorts out input resistor R33. This is done to short out the pling capacitor C23 when the signal becomes too large due to a large chan the input signal (during an LED power change or when the patient m etc.). The Ir signal is buffered by IC15 pins 12, 13, 14 and its input is sh to ground by the switch between pins 6 and 7 of IC25 which is also contr by the FILTIN line (IC25 pin 8).

The two buffered AC signals are then multiplexed onto one line then a nately sampled, this is done instead of "matching" an amplifier for each s (which would be required for the critical red/Ir ratio calculations done t quire the SaO_2 value). The multiplexing is done by the SA1 and SA2 l This is handled by IC17 pins 9, 10, 11 for the red channel and IC17 pins 14 16 for the Ir channel. The AS1 line (IC17 pin 9) is brought low for 2.5 n this closes the switch between pins 10 and 11 enabling the red AC sign feed IC16 pin 3 via coupling capacitor C98. The SA2 line (IC17 pin 16) c ates in the same manner. When SA2 line goes low for 2.5 msec (SA1 wi high) the Ir AC signal feeds IC16 pin 3 via coupling capacitor C99. The and SA2 lines operate alternately every 2.5 msec.

1.4.8 AC Gain and Offset Circuit

The red and Ir multiplexed signal from IC16 pin 1 feeds pin 3 of the converter IC14. This is a dual 12 bit D/A converter which performs two di ent functions. Channel A of IC14 which receives the multiplexed AC signa configured as a gain DAC. Channel B of IC14 is configured as an offset I which controls offset voltages of the red and Ir multiplexed AC signal.

Channel A of the DAC (gain DAC) uses the reference voltage pin VR (pin4, IC14) as the output amplifier's feedback line and the feedback res pin RFBA (pin 3) as the signal input. This will give an input to output ga 4095/n, where n is the 12 bit data programmed for that channel (a value 4095). Channel B is configured as a standard D/A converter, its output wi a set voltage corresponding to the data programmed for that channel. VBREF pin (pin 12) is connected to VREF- which will give an output of +4.1 volts for the binary value 0 - 495. The output current from IOUTB (pin is converted to a voltage at IC13 pin 7.

The negative input of IC16 pin 2 is configured as a summing amplifier. output from IC13 pin 7 is amplified with a gain of -.25 by R29 and R30, VREF- line is summed and amplified by -0.125 by R30 and R31. By summ these together IC16 pin 1 can give an adjustable offset corresponding to data programmed into DACB of IC14. The range of the offset is ± 512 mV.

The multiplexed red and Ir AC signal present at IC16 pin 3 is set to a of 1 (IC16 pin 1) by R30 and R32. This signal is added to the offset volt programmed by DACB of IC14, to allow software to adjust the DC level of AC signal to the middle of the ADC input range. Capacitor C22 reduces high frequency noise from appearing at the output.

The output from IC16 pin 1 is amplified to an optimum level by DACA IC14 and will appear as an output voltage at IC13 pin 1. This output feeds plifier IC12 pins 8, 9, 10, which is configured with a gain of 4 through R14 R21. The VREF- line also feeds this amplifier and is amplified with a gain 2 created by R14 and R20, this results in a +2.05 volt DC level at pin 8 IC12. This sets the signal at the middle of the ADC range so the offset D (DACB of IC14) can fine tune the signal to the exact center of the A (IC14) input range.

When the system is running the red and Ir AC signals are alternat switched into the gain DAC (DACA of IC14) every 2.5 msec. The gain val programmed into DACA come from a preprogrammed table in software c taining a number of different settings. The gain table is used by both the and Ir signals but the red and Ir gains are not necessarily the same at any time. So before the software switches the red or Ir signal into the gain DAC sets up the appropriate gain for corresponding signal in DACA.

For an optimum reading at the ADC input each gain setting for both s nals has its own particular offset value. These offset values are in the form o red and Ir offset table and are obtained during initial production testing of front end board. The offset tables are stored in the E^2PROM and are tra ferred to RAM during the initialization of the monitor after it has be switched on. In the same way that the gain is set up before each signal switched into the gain DAC, the corresponding offset is also set up.

1.4.9 ADC Circuit

The front end board monitors eight different parameters through the use an 8 channel, 8 bit A/D converter (IC11). This converter runs on a 142.8 K clock which is derived on the digital board. The eight channels are selected addressing the AØ-A2 lines (pins 17-19) with the appropriate address.

A2	A1	AØ	Channel Select	I/O Address (HEX
0	0	0	IN1	AØ
0	0	1	IN2	A1
0	1	0	IN3	A2
0	1	1	IN4	A3
1	0	0	IN5	A4
1	0	1	IN6	A5
1	1	0	IN7	A6
1	1	1	IN8	A7

Before a channel is read the address is written to AØ-A2 lines and ALC (Address Load Control) and SC (Start Conversion) lines are bro high. When the conversion is complete (25 µsec) the EOC (End Of Co sion) pin will go high to inform the processor that the value can be used.

The REF+ line is tied to VREF+ and the REF- line is tied to ar ground, this gives a digital value of 0-255 for the input range 0 - +4.1 The analog input range must never exceed the limit of -0.3 to + 5.0 volts c chip will be damaged. In order to guarantee this, inputs to channels 1, 2, 4 6 are taken from IC12. This is a quad, single supply operational amplifier v is supplied by +5.0 volts. Therefore the outputs cannot exceed the limi IC11. Channels 3 and 5 are limited to approximately 4.7 volts by IC21 pin 13, 14, D6 and R39. Input channels 7 and 8 of IC11 monitor levels whicl referenced to +5 volts, this keeps the maximum level present to the i within limits.

The channel numbers and their corresponding input signals are listec low.

CHANNEL	SIGNAL
IN1	AC NOISE
IN2	DC NOISE
IN3	RED DC
IN4	RED/IR AC
IN5	IR DC
IN6	V BATT
IN7	PROBE DETECT
IN8	VLED DETECT

NOTE: In Production Test Software the displayed channel number in the SATURA display does not correspond to the numbered channels listed above, reference section 2.6.

1.4.10 Noise Detection Circuits

Two channels of the A/D converter (IC11) are used to detect noise ir photodiode's signal. One channel (CH 1) detects AC noise which would b

the frequency range of 50 - 120 Hz (line voltage noise). The other cha (CH 2) detects DC noise which is caused by high ambient light levels. channel also checks for non compatible probes (non SuperBright™).

The input for both noise detection circuits is taken from IC21 pin 8. noise detection is performed by IC12 pins 1, 2, 3, C13, C15, R12, R16, R17. The low frequency breakpoint is created by C15 and R16, the high quency breakpoint is handled by C13 and R12. Resistor R17 is connecte VREF-, the combination of R12 and R17 amplify VREF- by -0.5, this sets output of pin 1 at the middle of the A/D converter's range (2.05 VDC).

The DC noise is detected by IC2 pins 5, 6, 7, C95, R13, R18, R2, and The gain is set to -0.5 by R13 and R18, C95 filters out high frequency nois acquire a smooth DC output at pin 7. Resistor R19 is connected to the VR line to set the output to the middle of the A/D converter's range. If a non perBright™ probe is installed the output of IC21 pin 8 will pulse nega (photodiode reversed), this will forward bias D1 which in turn changes gain to -100 through R2. The output will therefore saturate signalling the p cessor that a non SuperBright™ probe has been installed.

2.0 Maintenance Schedule

2.1 General

All Novametrix Medical Systems Inc. equipment is warrantied for a pe of one year from the date of shipment, except for certain disposable prod and products with stated guarantees other than one year. However, to in the functional integrity of the monitor, Novametrix recommends the follo maintenance schedules be adopted with regard to the Model 515.

At the customer's request, Novametrix will provide repair and calibra services under the terms of a Service Contract. Contact the Novametrix vice Department at 1-800-243-3444 (in Connecticut call Collect 203- 7701) for contract details.

2.2 Battery Maintenance

The monitor was shipped from the factory with a fully charged bat Since the monitor draws some battery power even while turned off, it is rec mended that the monitor be operated on line power for the first 24 hours t low ample time for the battery to fully recharge.

In the case of prolonged periods of storage or shipment the battery discharge to a point where the unit will not turn on. Should this occur, plu the line cord, set the switch on the rear panel to the | position, turn the mo off (ensure that the green ~ LED on the front panel is illuminated), and a the monitor to charge for 24 hours before switching it on.

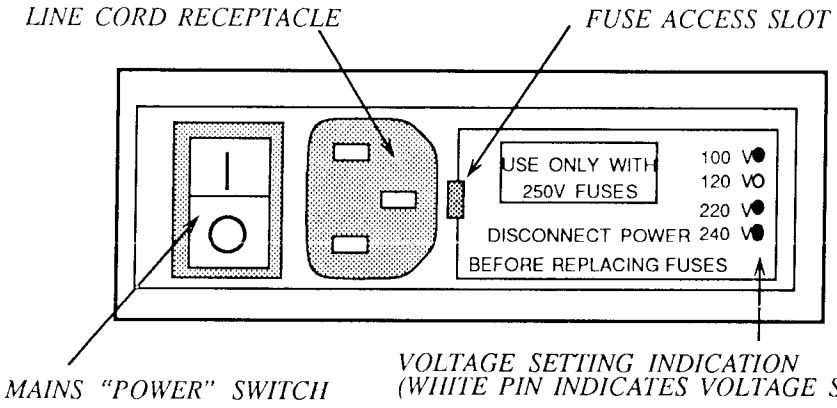
To insure maximum battery life and performance, the Model 515 shoul operated in the battery mode until the low battery indicator lights (line disconnected) at least once each month. The line cord should then be re nected and the battery given sufficient time to recharge. The monitor ma operated normally on line power while the battery is recharging. Approxim ly 16 hours are required to fully recharge a discharged battery.

Every six months the battery should be visually inspected for defects cluding but not limited to, swollen or misshapen sides, leaking battery acid, posed conductors or frayed insulation. If any of these conditions exist, co the Novametrix Service Department for a battery replacement. Replacer batteries are subject to a replacement charge.

2.3 Fuses and Line Cord

Should the fuse(s) need replacement be sure to replace with the same and rating; 250 V 1/2A slow-blow for 100V and 120V units; 250 V 1/4A sl

blow (2 each) for 220 V and 240 V units. The fuse is accessed from the po entry module located on the rear panel. Ensure the mains switch is in th (off) position when replacing the fuse. Place a small screwdriver into FUSE ACCESS SLOT and pry the fuse block off to expose the fuse(s).



The line cord supplied is a tested "HOSPITAL GRADE" the type, av using other types of cords. If the cord is damaged or frayed contact Novame Service Dept. for a replacement. Ensure the unit is plugged into a prope grounded 3 wire outlet, under no circumstances should the ground pin on plug be bypassed.

2.4 Operational Tests

The Operational Tests should be performed upon receipt of the monitor, insure the unit and sensors are working properly. The Operational Tests m also be used as a "spot check" to verify system malfunctions.

2.5 Cleaning the Model 515

To clean the Model 515, turn off the system power and unplug the line co Dampen a cloth with isopropyl alcohol and wipe the keypad and soiled surf areas of the unit clean. Dry with a clean cloth or paper towel. Clean the s sors in the same manner.

2.6 Calibration Verification and Adjustments

The microprocessor based electronics within the Novametrix Model 515 not require any scheduled user calibration or service (aside from batteries a fuses).

A Calibration Procedure and Adjustment Procedure have been included this manual to aid the service technician in verifying the calibration accuracy the monitor. All servicing should be carried out by qualified service personnel.

3.0 Operational Tests

3.1 Introduction

The Operational Tests for the Model 515 Pulse Oximeter should be formed on each monitor before it is placed in the clinical environment. tests may also be used to check the monitor in case reports of monitor functions are received. The test verifies the overall operation of the mo and sensors. This test does not verify the performance accuracy of the mon for this refer to the "Calibration and Adjustments" section of this manua the monitor does not pass these tests contact the Novametrix Service De ment.

3.2 Operational Checks

3.2.1 Equipment Required

1. Line cord PN: 600026
2. SuperBright™ sensor (87XX series)
   (non-SuperBright™ sensors will not work with this unit)

3.2.2 Visually inspect the monitor, verify that there is no external damage. Sl the unit, check that there is no loose hardware inside.

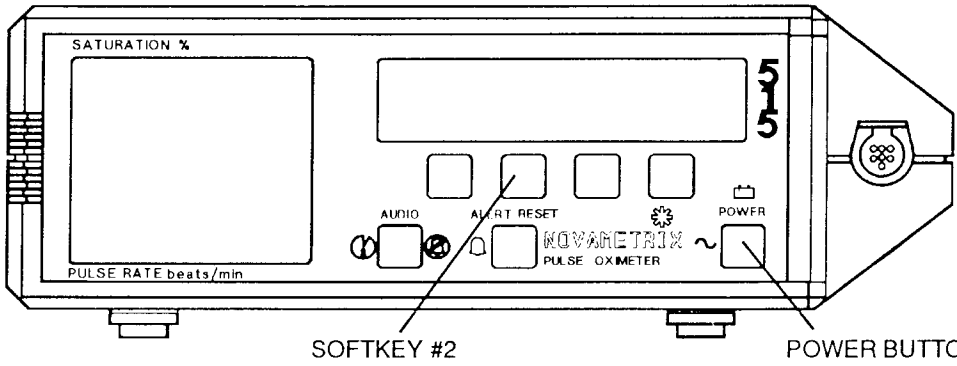
3.2.3 Inspect the line cord, verify no frayed wires, ensure it is mechanically sound.

3.2.4 Inspect the sensors, check for defects and frayed wires, verify no damage.

3.2.5 Check the rear panel power entry module, ensure that it is set to the pr voltage. Set the switch to the **O** position then plug the line cord into the m tor.

3.2.6 Place the mains switch to the | position, verify the green ~ LED on the f panel illuminates.

3.2.7 Simultaneously press the #2 softkey (second from the left) and the **POW** button.



Verify the monitor turns on and all the front panel segments and LEDs illu nate, and an audible tone sounds for approximately 10 seconds. The mon will then perform a self test and operate in normal mode.

NOTE: If the self test fails; "SELF TEST FAILED" will be displayed (error m sages and codes may accompany this), turn the monitor off and repeat power up sequence, if it does not work record the error messages displa (reference section 8.0) and contact the Novametrix Service Department.

3.2.8 The monitor will then flash "CONNECT 87XX PROBE". Press the **AUDIO** k and alert tone should sound, press and hold the **AUDIO** key until the L flashes and the alert tone is off.

3.2.9 Press the **Menu** softkey, press **NEXT**, verify "SET AUDIO FEATURES?" pears, select **VOL**. Use the ↑ and ↓ softkeys to set the volume level to "((lowest level) then press **ENTER**.

3.2.10 Press the **NEXT** softkey twice until "SET DISP BRIGHTNESS" is displa press **SET**, use the ↑ and ↓ softkeys to vary the brightness from Ø3 to Ø1, v ify Ø3 is the brightest with Ø1 being the dimmest. Press **ENTER**.

3.2.11 Press **NEXT**, verify "SET ALERT LIMITS?" appears, select **PULSE**, then sel **HIGH**. Use the ↑ and ↓ softkeys to change the high Pulse Rate limit, record t value. Press the **ENTER** softkey.

3.2.12 Turn the unit off by pressing the **POWER** key on the front panel. Turn the u back on and verify that the Pulse Rate high limit was saved.

3.2.13 Turn the monitor off. Plug the sensor into the monitor's input connector. T the monitor on by pressing the front panel **POWER** key. The display will re "PROBE OFF PATIENT" or "LIGHT INTERFERENCE".

3.2.14 Connect the sensor to yourself. Verify that after a short delay, the dis shows a bar graph that pulses with each heartbeat. After several seco your SaO2 and Pulse Rate values will be displayed.

3.2.15 Press the **Menu** softkey, select the **NEXT** softkey. At the "SET AUDIO F TURES?" display press **PULSE**. Press the **ON** softkey at the "AUDI PULSE" display.

3.2.16 Place the mains switch on the rear panel power entry module to the **O** p tion. Verify the unit operates off battery power. Place the mains switch bac the | position, verify the ~ LED on the front panel illuminates. Turn the mon off by pressing the front panel **POWER** key.

4.0 Calibration and Adjustments

4.1 Calibration Procedure

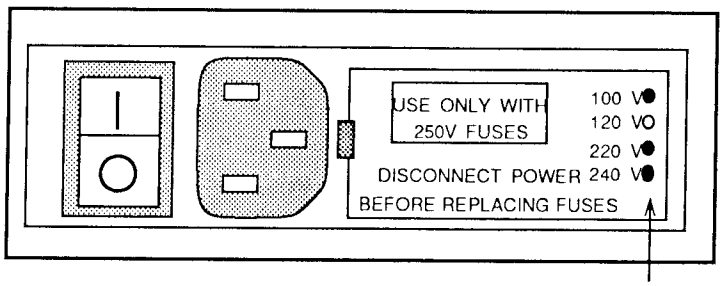
This section is intended to verify the calibration of the Model 515. Th done by connecting the monitor to the TB500A sensor simulator. The TB5 simulates various saturation levels at different signal strengths along faulty probe conditions. The TB500A is the only acceptable method of verif the accuracy of the Model 515 Pulse Oximeter and is available through Novametrix Service Department.

The following procedure assumes that the monitor is set to its fac default parameters. This can be accomplished by simultaneously pressing **ALERT RESET** key and the **POWER** key until the monitor powers up. monitor will perform a self test, display "Parameters Reset To Factory Def and will then operate in normal mode. If the unit is not set to its factory de settings then alerts may not be triggered at the appropriate times in procedure, the remainder of the procedure should still apply.

4.1.1 Equipment Required

1. Line cord PN: 600026
2. TB500A Sensor Simulator modified for use with Model 515 (with SuperBright™ adaptor cable, available from Novametrix Service Dept.)

4.1.2 Verify the rear panel power entry module is set to the correct voltage.



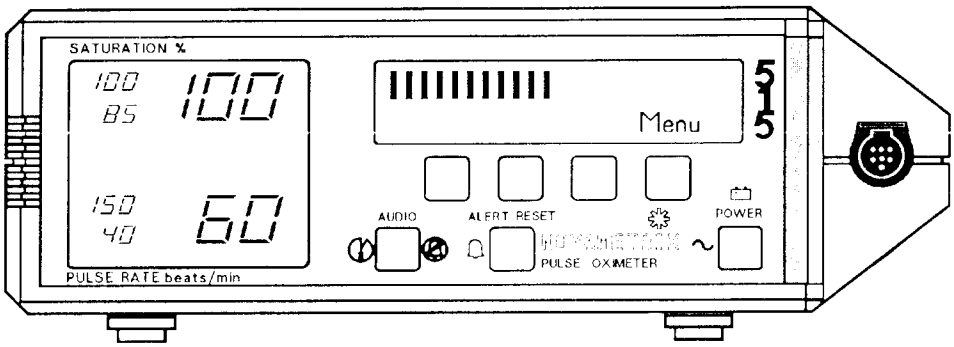
VOLTAGE SETTING INDICATION
(WHITE PIN INDICATES VOLTAGE SETTING)

4.1.3 Connect the line cord to the rear panel of the monitor. Plug the line cord into appropriate outlet. Place the switch on the power entry module to the | po tion.

4.1.4 Verify the green ~ LED on the front panel is illuminated. Press the **POW** button, verify the monitor passes the self tests and displays "CONNECT 87 PROBE".

4.1.5 Set the controls on the TB500A as follows;
SIGNAL ATTENUATION: 3
SATURATION: 100
Turn the TB500A **ON** and connect it to the monitor.

4.1.6 Verify that the monitor's display settles at 100 -99 and the PULSE RATE 60 bpm ± 2 bpm. Verify the bar pulses with each pulse rate tone.



4.1.7 Vary the SATURATION and ATTENUATION values on the TB500A as ed below, verify the values are within the specified tolerances.

NOTE: When alerts sound press and hold the **AUDIO** key until the (▲) L flashes (this will defeat the alert audio tones).

SATURATION	SIG. ATTEN.	SATURATION% (displa
100	3	99-100
92	3	90-94
82	3	82-86
72	3	75-79 (ALERT)
62	3	67-71 (ALERT)
100	9 Press **ALERT RESET**	98-100 (No Alert)
92	9	88-96
82	9	80-88
72	9	74-80 (ALERT)
62	9	not specified (ALER

4.1.8 Set the SATURATION to **O**, verify that after thirty seconds the pulse bar appears, the SATURATION and PULSE RATE values disappear and the a flashes.

4.1.9 Set the SATURATION to **100**, verify that after a few seconds the monitor turns to normal operation, press the **ALERT RESET** key to turn the alert off.

4.1.10 Set the SIGNAL ATTENUATION to **1**, verify the SATURATION and PUL RATE displays blank out and "PROBE OFF PATIENT" flashes on the display.

4.1.11 Set the SIGNAL ATTENUATION to **3**, verify the monitor return to normal eration.

4.1.12 Press and hold the **RED** button on the TB500A, check that after a few sec "PROBE ERROR-Ø4" appears on the display. Release the button and v the monitor returns to normal operation.

4.1.13 Press and hold the **INFRARED** key on the TB500A. Verify that "PROBE ROR-Ø2" appears after a short while. Release the button and verify the m tor returns to normal operation.

4.1.14 Turn the monitor off, if all the tests in this procedure have passed then monitor is correctly calibrated.

4.2 Adjustment Procedure

This section contains information for calibrating the electronic circuits w in the Model 515. Only qualified service personnel should attempt to perf these tests and adjustments. Each board is dealt with in an individual man all the test fixtures used are documented in section 4.3 with the exceptio the TB500A which is available from Novametrix Service Department. Be to follow proper grounding procedures when handling the internal electr components to avoid damage from static discharge.

Equipment Required

1. Tested and aligned Model 515 Monitor
2. TB500A Sensor Simulator (modified for Model 515)**
3. Dual trace oscilloscope*
4. Variable power supply (0-12VDC @ 2A) with current limit *
5. RS232 Test fixture (see section 4.3)
6. Front End Test Jack (see section 4.3)
7. Analog Module PN:2289 (for analog output checks only)
8. DVM*

*Calibrated and N.B.S. traceable
**Available from Novametrix Service Dept.

2503 Power Supply Board

4.2.1 Disconnect the line cord from the monitor. With the battery connected meas the following voltages on the 2503 board, use the negative lead of the batt as reference.

IC2 pin 1 (VBAK)	4.5 VDC ± 0.2
IC3 pin 4 (PSUST)	+5 VDC ± 0.2

4.2.2 Attach the line cord and place the rear panel mains switch to the | posit Verify that the front panel ~ LED illuminates. Remove the red lead from battery, using a DVM check the voltage between the red and black battery bles, verify +13.8 VDC ± 0.02 volts. Reconnect the red lead to the battery p itive terminal.

4.2.3 Turn the monitor on by pressing the front panel **POWER** button.

4.2.4 Verify the unit powers up and passes the self test, then displays "CONNE 87xx PROBE" while flashing an alert. Check that after a few seconds an a tone sounds, press and hold the **AUDIO** key until the (♪) LED flashes and alert tone stops.

4.2.5 Measure the following voltages, use the negative lead of the battery as re ence.

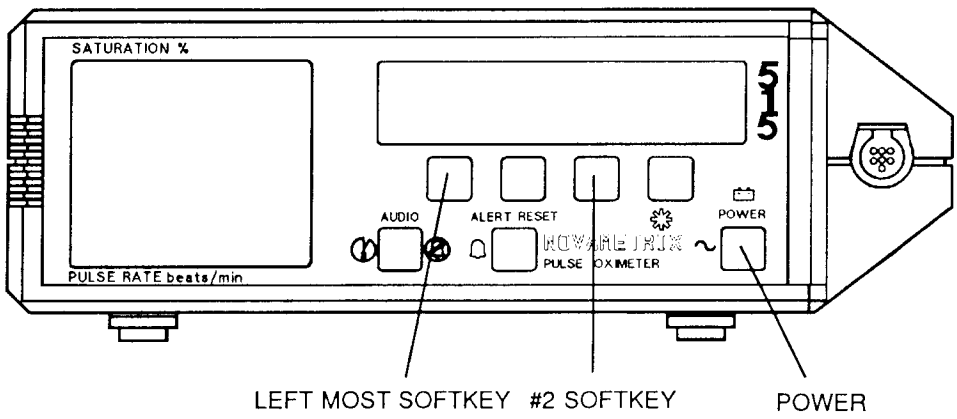
FS5 on 2503 board (VDD)	+5.1 VDC ± 0.02
+VA21 (pin 4 of IC21 on 2288 board)	+12.8 VDC ± 0.5
-VA21 (pin 11 of IC21 on 2288 board)	-12.8 VDC ± 0.5

4.2.6 Using the rear panel ground connection as reference measure the voltage pin 16 of IC8 on the 2503 power supply board. Verify + 5 VDC ± 0.2 volts.

2283 CPU Board

4.2.7 Place the mains power switch on the rear panel to the | position.

4.2.8 Simultaneously press the **POWER** and leftmost softkey, after the mon beeps for the second time press and hold the #2 softkey (second from right), verify that "Novametrix Inc. Production Tests" appears on the display.



4.2.9 Check pin 14 on ICG4 for +5.1 VDC ±0.02 v (VDD).

4.2.10 Check pin 28 on IC4 for 4.5 VDC ± 0.2 v (VBACK).

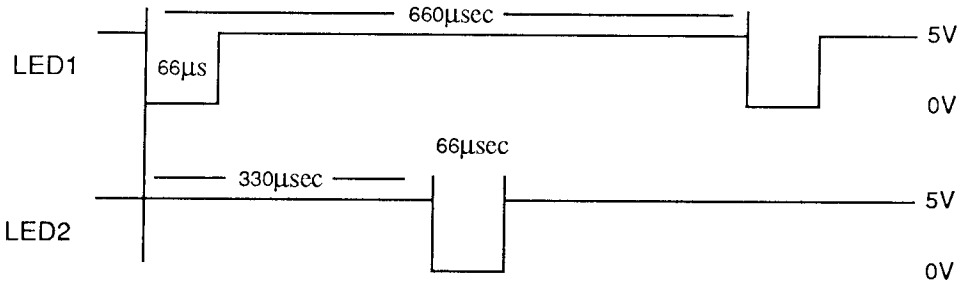
4.2.11 Verify that MONITOR TEST - 01 appears on the display. Press the **Test** sof and verify that Automatic Test appears on the display, press the **Test** key to tiate the test. Verify that all the tests pass, auto test numbers 4 and 5 wil quire pressing either the PASS or FAIL softkey to continue the test. The monitor test will require turning the mains off, then on again when the dis instructs.

4.2.12 Select MONITOR TEST - 07 using the **Next** softkey, press **Test** and verify Rs232 loopback Test appears on the display. Connect the RS232 test fixtur the rear panel connector. Press **Test** to initiate the test. Verify the mo passes all tests.

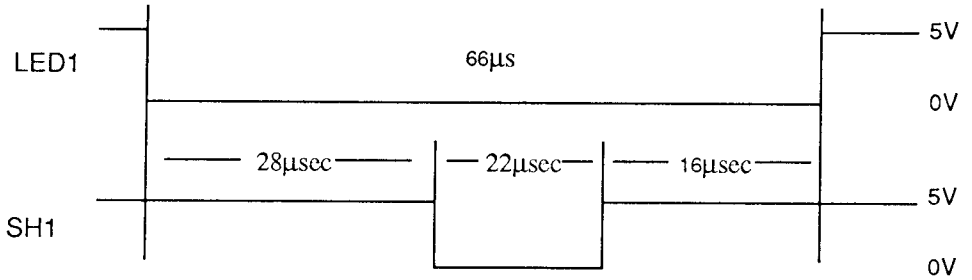
4.2.13 Press the **Next** softkey to select MONITOR TEST - 09, press **Test** twice to tiate the test. Verify Select tst Parameter appears on the display.

4.2.14 Scope the following set of points, verify the indicated parameters.

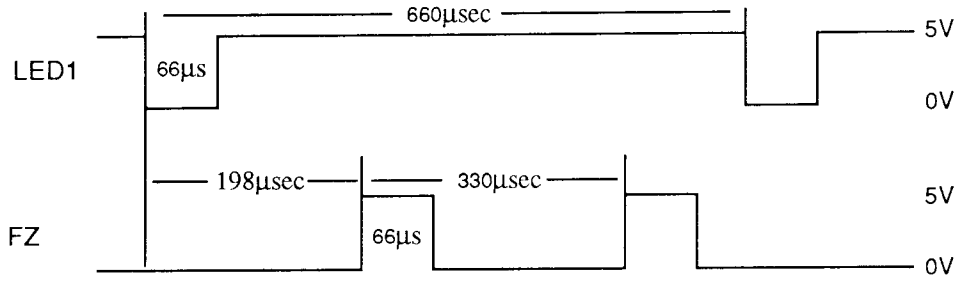
4.2.15 ICG7 pin 4 (LED1); ICG7 pin 2 (LED2).



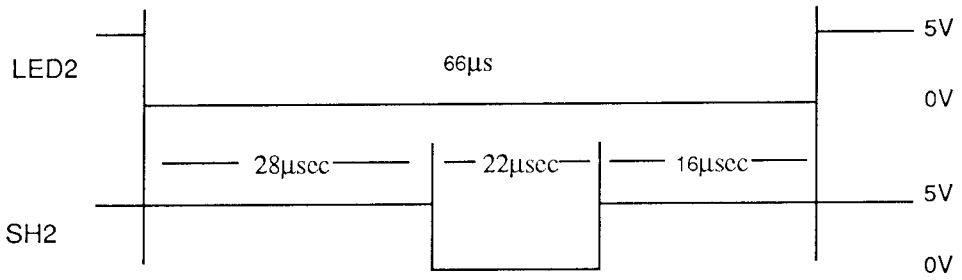
4.2.16 ICG7 pin 4 (LED1); ICG6 pin 6 (SH1).



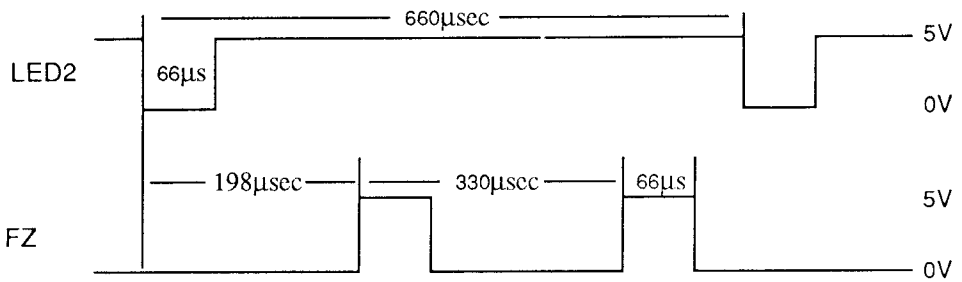
4.2.17 ICG7 pin 4 (LED1); ICG7 pin 6 (FZ).



4.2.18 ICG7 pin 2 (LED2); ICG6 pin 8 (SH2).



4.2.19 ICG7 pin 2 (LED2); ICG7 pin 6 (FZ).



4.2.20 Scope ICG7 pin 6 (FZ), press the **Next** softkey, then select **Fets**. Press **On** key and verify that the FZ signal is logical 1 (5 volts), the speaker v sound a beep.

4.2.21 Monitor ICG12 pin 6 (ADCCLK), verify a squarewave with a 7µsec period.

4.2.22 Monitor ICG17 pin 19 (SA1), verify a squarewave with a time period of msec ±0.15 ms.

4.2.23 Monitor ICG17 pin 18 (SA2), verify a squarewave with a time period of msec ±0.15 ms.

4.2.24 Press the **End** softkey, then press **Next** until MONITOR TEST - 11 appears the display. Press **Test** and verify "Probe error test" appears.

4.2.25 Press the **Test** softkey and verify "NO PROBE CONNECTED" is shown on display. Plug the sensor simulator or a good probe into the front panel soc verify "PROBE CONNECTED" appears.

4.2.26 Plug the analog module into the rear panel 25 pin connector, use pins 2, 3 ground reference when measuring the output voltages.
NOTE: This step and the next is for analog output checks only.

4.2.27 Press the **quit** softkey. Press the **Next** softkey to select MONITOR TEST - press the **Test** softkey. Monitor output pins 1, 4, and 9 of the analog mo for the voltages listed below. Use the **Dec** and **Inc** softkeys to verify the va below.

SATURATION% PULSE RATE	OUTPUT VOLTAGE Pins 1, 4, 9
0	0 ± 10 mv
50	0.5 ± 20 mv
100	1.00 ± 50 mv
200	2.00 ± 50 mv
250	2.50 ± 55 mv

4.2.28 Turn the monitor off, simultaneously press the second softkey from the left the power button, verify all the segments on the VFD display are illumina along with all the LEDs, and the audio alarm, for approximately 8 secor Then verify that the units resets into normal operating mode.

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4.2.29 With the monitor off simultaneously press the leftmost softkey and the po button, as soon as the unit beeps press and hold the second softkey from right, verify the unit powers up in test mode, "Novametrix Ltd. Production T will appear momentarily.

4.2.30 Use AGND as reference for all measurements unless otherwise stated (top R58). Measure the following voltages;

IC21 pin 4 ..... +12.8 VDC ± 0.5V (+VA21)
IC21 pin 11 ..... -12.8 VDC ± 0.5V (-VA21)
IC12 pin 4 ..... 5.1 VDC ± 0.02 (+5VA)
IC15 pin 1 ..... +4.2 VDC ± 0.2 (VREF+)

4.2.31 Use the **Next** softkey to select "MONITOR TEST - 09". Press the **Test** softk verify the display shows "Anal. Front End Test", press the **Test** softkey again initiate the test.

4.2.32 Monitor IC22 pin 1 and pin 8 with the oscilloscope. Press **Led**, when "LED C rent DAC IC20" appears press **Ramp**.

4.2.33 Verify that the signal on IC22 pin 1 increases smoothly and linearly fro volts to approximately 2 volts, while IC22 pin 8 decreases smoothly and early from approximately 4 volts to 2 volts.

4.2.34 Connect the test jack to the front panel connector on the monitor.

4.2.35 Press **Next** twice, select **Adc** and use the **Inc** and **Dec** keys to monitor cha 0 (SATURATION% display).

4.2.36 Press **Prev** twice, select **Leds** then press **Red**.

4.2.37 Use the **Inc** and **Dec** softkeys so that the channel 0 value (PULSE RATE play) is 192 ±1, check that the value of the DAC (red drive current) is 6E 1ØH.

4.2.38 Press the **Next** key three times then select the **Adc** option. Use the **Inc** **Dec** keys to monitor channel 4.

4.2.39 Press **Prev** twice then select **Led**. Press the **Ir** softkey.

4.2.40 Use the **Inc** and **Dec** softkeys so that the channel 4 value is 192 ± 1, check the value of the DAC (ir drive current) is B8H ± 1ØH.

4.2.41 Remove the test jack from the front panel connector. Connect the TB500A the monitor, set the SIGNAL ATTENUATION to 5 and the SATURATIO 0. Turn the TB500A on.

4.2.42 Monitor IC21 pin 7. Verify that at the base of the pulse just before they to rise is 0 volts ± 50 mv.

4.2.43 Monitor IC21 pin 1. Verify that the base of the pulse just before they star rise is 0 volts ± 75 mv.

4.2.44 Set the TB500A to **92%**, and the SIG ATTEN. to **6**. Monitor IC18 pin 14 channel A of the oscilloscope (AC coupled), monitor IC 15 pin 8 with cha B of the oscilloscope. Verify a 1 Hz signal on channel B with a gain of 0.8 that on channel A. Monitor IC18 pin 8 with channel A, IC15 pin 14 with ch nel B, verify channel B has a gain of 0.8 of that on A. In both cases check the signal on A is 200 mv ± 150 mv.

4.2.45 Select the **Fets** test (press **Next** three times), turn them **On**, verify the sig are grounded.

4.2.46 Monitor pin 7 of IC13 with the oscilloscope. Press **Prev**, select **Offs** then p **Ramp**. Verify a squarewave of approximately 4 volts peak (with a period of msec high and 2.5 msec low) that steadily decrease in amplitude and se to a steady DC value at approximately 2 volts.

4.2.47 Press the **Next** softkey then press **Gain**. Set the **Ir** to ØFFF using the softkey. Press **Next** set the **Red** to ØFFF using the **Pset** softkey, press twice.

4.2.48 Press **Offs**, select **Ir** and set it to ØØØØ using **Pset**, press **Next** select and set it to ØØØØ using **Pset**, then press **Next** twice.

4.2.49 Press **Next**, press **Adc** use **Inc** and **Dec** to record values (SATURATION channels 2 and 6 (PULSE RATE). Press **Prev** twice.

4.2.50 Press **Offs**, select **Ir** and set it to ØFFF using **Pset**, press **Next** select **Red** set it to ØFFF using **Pset**, then press **Next** twice.

4.2.51 Press **Next**, press **Adc** use **Inc** and **Dec** to record values (SATURATION channels 2 and 6 (PULSE RATE). Verify the difference between the first second recorded values for each channel is 23 - 29.

4.2.52 Press **Prev** twice, select **Gain** press **Ir** and set the gain to ØØØA using the key. Press **Next** select **Red** and set the gain to ØØØA using the **Pset** Press **Next** twice.

4.2.53 Press **Next**, press **Adc** use **Inc** and **Dec** to monitor channel 2, press **Prev** tv then select **Offs**. Press the **Ir** key and use the **Inc** and **Dec** key to slowly ad so that the reading is steady at Ø. Adjust the offset so that the display st to read a value greater than zero (Ø). Record this value.

4.2.54 Adjust the offset of channel 2 so that the reading is steady at 255. Slowly just the offset so that the reading is just below 255. Record the value of DAC.

4.2.55 Press **Next** three times, select **Adc**, use **Inc** and **Dec** to monitor channel Press **Prev** twice then select **Offs**. Press the **Red** key and use the **Inc** and key to slowly adjust so that the reading is steady at Ø. Adjust the offset that the display starts to read a value greater than zero (Ø). Record this value.

4.2.56 Adjust the offset of channel 6 so that the reading is steady at 255. Slowly just the offset so that the reading is just below 255. Record the value of DAC.

4.2.57 Check that the difference between the fist and second recorded offset val for each channel is 64H ± ØAH.

4.2.58 Power down the unit, place the rear panel power switch to the O position.

4.2.59 NOTE: Do not perform the following two steps (MONITOR TEST 15) unl IC10 on the 2288 Analog board has been replaced.
Connect an external power supply set for +12 volts in place of the batte Power the unit up in test mode, select "MONITOR TEST - 15". Press **Test** twice.

4.2.60 Set the external power supply to + 10.0 VDC ± 0.02 volts as the display structs, press **enter**. Set the supply to +11.8 VDC ± 0.02 volts when the play instructs, press **enter**. Verify that the test passes. Turn the monitor off.

4.2.61 Press the **POWER** button on the front panel. Verify that the monitor powers and passes the self test, then resumes normal operation. Plug the TB5(Sensor Simulator into the front panel sensor socket.

4.2.62 Set the SIGNAL ATTENUATION to 3 and the SATURATION to 92 on TB500A. Turn the simulator on.

4.2.63 Vary the SATURATION and SIGNAL ATTENUATION as indicated in following table, verify the correct display values appear as indicated.

SATURATION	SIG. ATTEN.	SATURATION% (display)
100	3	99-100
92	3	90-94
82	3	82-86
72	3	75-79
62	3	67-71
100	9	98-100
92	9	88-96
82	9	80-88
72	9	74-80
62	9	not specified

4.3 Production Test Software

This section describes the special "Production Test Software" used in c brating and troubleshooting the monitor. To access this software refer to tion 4.5.

MONITOR TEST Ø1- "Automatic Test", monitor tests Ø2 thru Ø6, and 1Ø are automatically ran in sequence. If any failures are encountered monitor will stop at the particular test number that failed. For example, if Ø3 failed then the monitor will stop at "MONITOR TEST Ø3".

MONITOR TEST Ø2- "RAM Test", test RAM from AØØØH to ØFF by writing 55H and then AAH to each RAM location and reading it back, tests each data bit.

MONITOR TEST Ø3 - "ROM Checksum test", checks the calcula checksum of the EPROM against that value stored in EEPROM, if the val are different the monitor must perform an auto calibration before it can run n mally. This will occur if the system software has been changed to ensure front end is calibrated with each revision level change in software.

MONITOR TEST Ø4- "Real Time Clock test", This performs two on the RTC. The first test checks the 50 bytes of internal RAM inside the by writing a test byte to each location, then reading it back verifying that w was written equals that which was read.
The second test sets the RTC to 23:59:57 Sat 31-Dec-58, then waits a seconds and checks that the time is now 00:00:00 Sun 1-Jan-59. NOTE: test would fail if the system clock oscillator or the RTC oscillator circuitry inoperative. The correct time and date must be reprogrammed after run this test.

MONITOR TEST Ø5- "Audio Volume Test", this is a volume ram test, every 0.1 seconds a different volume setting is set to produce a dist tive pinging sound when working correctly.

MONITOR TEST Ø6- "Audio Frequency Test", the frequency sett are ramped to produce an "arcade" game type sound.

MONITOR TEST Ø7- "Rs232 loopback Test", by placing the RS232 fixture on the rear panel 25 pin D connector the two RS232 communica channels are checked by transmitting a signal and verifying it is received a input (loopback).

MONITOR TEST Ø8- "Eeprom test", this test clears the eeprom (I on the 2288 board) and then writes a message into the eeprom. It then re back the message and verified that it is the same as that written.

MONITOR TEST Ø9- "Anal. Front End Test", contains various which monitor/check various front end functions.

Gain: The Gain DAC (IC14A) for each channel (red and Ir)can be p grammed to any value through the use of the Inc Dec and Pset softkeys.

Offs: The Offset DAC (IC14B) for each channel (red and Ir)can be p grammed to any value through the use of the Inc Dec and Pset softkeys.

Led: The LED drives can be varied for either channel (red or Ir) by Inc and Dec softkeys, or the Ramp function can be selected where b channels will ramp simultaneously.

Fets: Enables manual control over the front end FETs Q3, Q4, Q9, Q10.

Adc: Enables monitoring of each of the analog channels of IC11 by of the Inc and Dec softkeys. The SATURATION% display indicates channel being monitored while the PULSE RATE display indicates the c rent value of that channel (0-255).

The following list identifies the Production Test software channel nu bering (SATURATION% display) with the actual IC's channel numbe (as shown on the schematic).

MONITOR TEST Ø9 CH# (SATURATION %)	Label	IC11 CH#
0	Red DC	3
1	Noise AC	1
2	Ir AC	4a
3	Vbat	6
4	Ir DC	5
5	Noise DC	2
6	Red AC	4b
7	V LED	8

MONITOR TEST 1Ø- "Mains detect test", checks that the monitor r izes when the mains is powering the unit or if it is under battery power. Thi done by monitoring the LNEST line from the power supply.

MONITOR TEST 11- "Probe error test", verifies that the monitor rec nizes when a probe is installed. This is done by monitoring the STLED1 STLED2 lines from IC23 on the 2288 analog board.

MONITOR TEST 12- *NO LONGER IMPLEMENTED*

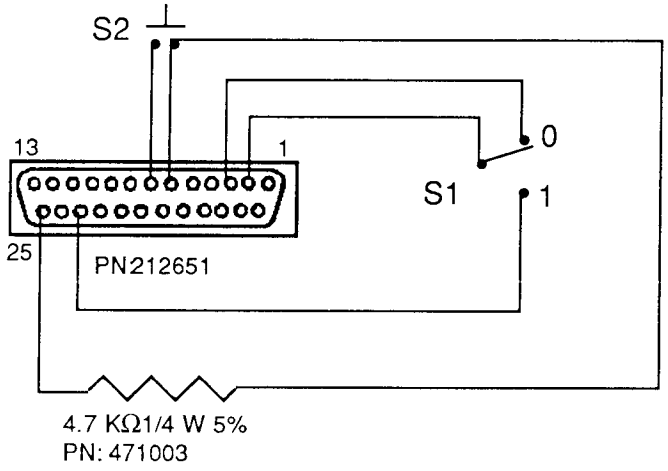
MONITOR TEST 13- "Analog Output Test", this enables adjustment the analog output channels from their lowest value to their highest value, test requires the use of the analog output module which attaches to the panel.

MONITOR TEST 14- "Front End Calibrate", this test automatically just the red and Ir AC channels for offset differences. This is done by turn the front end FETs on which shorts the input stage to ground. Then for e gain setting on each channel (red and Ir, each has 12) a value is written to B portion of IC14 which in turn controls IC13 pin 7. This signal is summed v the input signal at IC16 (pin 2) which is the input to the A portion of IC14 is configured as a gain DAC. Thus for each gain setting for each channel correct offset must be written to the offset DAC to cancel any offset IC16 r have.

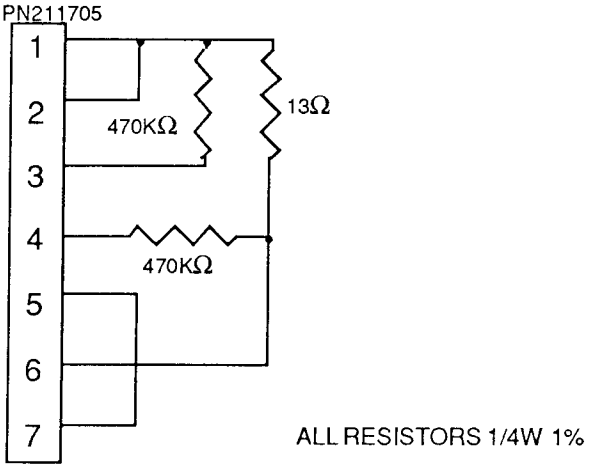
MONITOR TEST 15- "Vbat calibration", this test is done to program t tery voltages into the eeprom on the analog board for battery monitoring p poses. With the unit powered by an external DC supply in place of the batt the supply is set to 10 VDC. The monitor reads this value and stores the sult in memory, the same is done at 11.8 VDC. If the values read are wit acceptable limits then the test passes.

4.4 Test Fixtures

4.4.1 RS232 Test Fixture



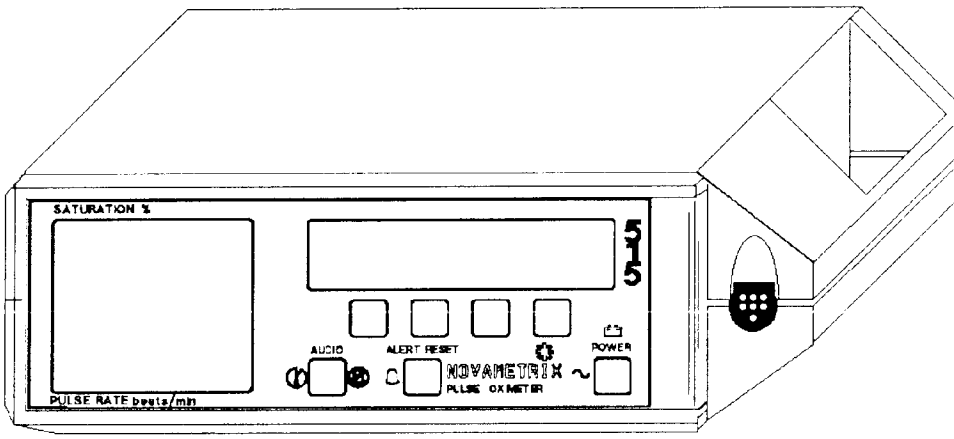
4.4.2 Front End Board Test Fixture



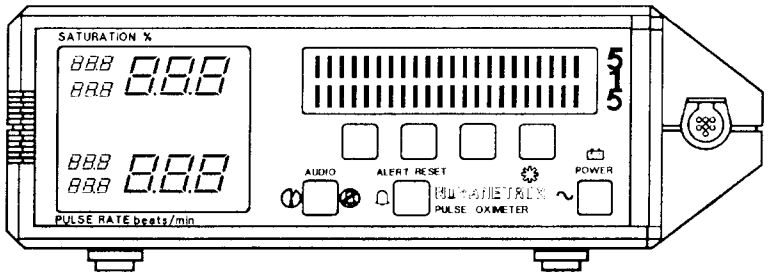
4.5 Special Functions

There are hidden functions which are programmed into the Model 5
Pulse Oximeter, these functions are called up by simultaneously pressing

or more of the front panel keys simultaneously while the monitor is off. The lowing list provides information on these special functions.



- **Production Test**: Internal test software is accessed by simultaneously pressing the leftmost softkey and **POWER** button, then when the monitor beeps a second time press and hold the third softkey from the left. "Novametrix Inc. Production Test" will appear on the display. For detailed information on the Production Test software reference the Adjustment Procedure in this section and the 515 Menu Structure drawing # 9671-53-09.
- **NMI Test**: This test is initiated by simultaneously pressing the second softkey from the left and the **POWER** key. The unit will power up, all the segments on the displays and all the LEDs will illuminate, a continuous tone will also sound from the unit for approximately 8 - 10 seconds. The monitor will then perform a self test and power up in the normal mode.



- **Recorder Outputs**: With the Analog Output Module connected to the rear panel RS232 D-connector the recorder output levels can be checked. By simultaneously pressing the third softkey from the left and the **POWER** key the recorder outputs can be set to 0, 1/2, or full scale for adjust-

ment of external recorders. For more information reference section 7.4 of this manual.

- **Options Menu**: By simultaneously pressing the fourth softkey from the left (rightmost) and the **POWER** key the options menu will appear. This menu enables programming of the serial output format of the RS232 connector on the rear panel, setting of the date and time, and control of the special functions within the monitor.
- **Software Revision Level**: The current revision level of the monitor's software will be displayed along with the date if the **AUDIO** and **POWER** keys are pressed simultaneously. The display will continue to display this information until the **AUDIO** key is released, then the monitor will perform a self test and begin to operate in normal mode.
- **Default Settings**: The factory set defaults will be programmed into the monitor if the **ALERT RESET** and **POWER** keys are pressed simultaneously. A "Parameters Reset To Factory Default" message will be displayed after a self test, then the unit will operate as normal.

The factory set defaults are listed below;

Saturation	High Alert Limit - 100 Low Alert Limit - 85 Averaging Time - 8 seconds
Pulse Rate	High Alert Limit - 150 Low Alert Limit - 40 Averaging Time - 8 seconds
Audio	Volume - 7 (loudest) Pulse "Beep" - OFF
Display Brightness - 2 (medium)	
Options Menu	Clock/Calendar - 12:00:00 hrs, 01-Jan-89 Serial Output Mode - Full Format, 1200 baud, no parity, 8 data bits, 1 stop bit Permanent Mute Enabled - Yes Alert Bar Latched - Yes Pulse Alert Lims On - Yes Display Held Timer (No-Sat-Update) - ON Special Alert Delay-30s Sel Disp. Hold Time - 60s

5.0 Assembly and Disassembly

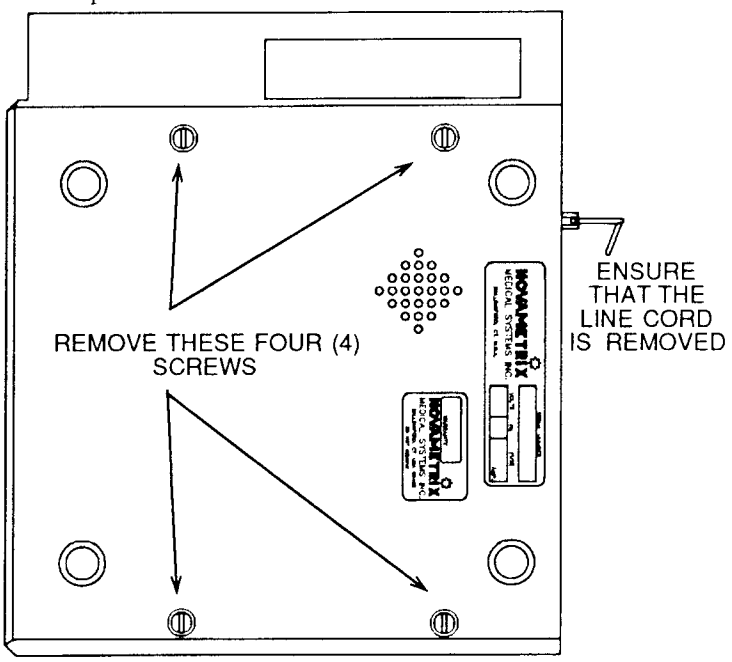
5.1 Introduction

This section outlines the configuration of the different assemblies wh make up the Model 515. Disassembly of the monitor should not be perforn unless necessary, and only by qualified service personnel.

5.2 Disassembly

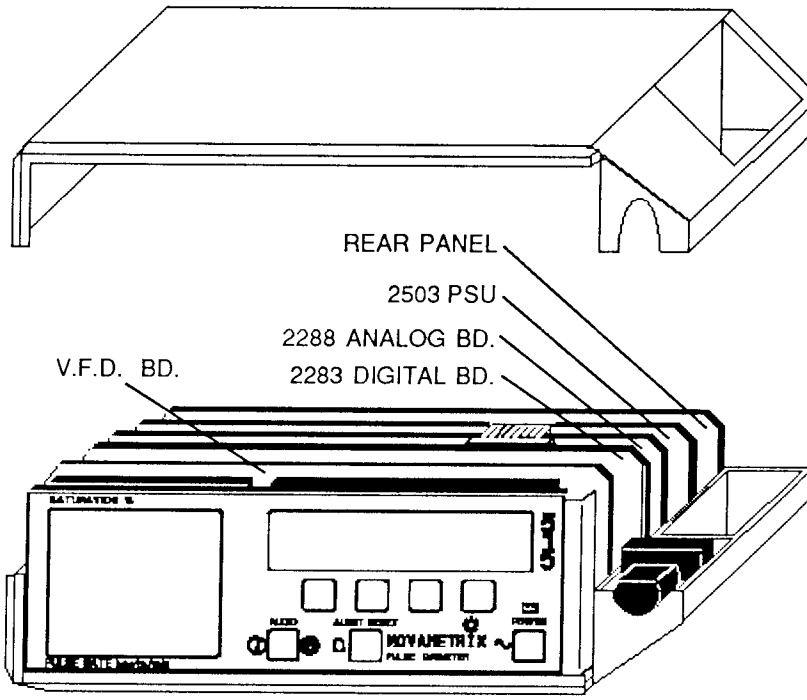
Before disassembling the Model 515 Pulse Oximeter ensure that the u is off and the line cord is removed to avoid possibilities of electrical shock. T internal electronics of the Model 515 contain static sensitive devices, when er handling the internal assemblies be sure to follow proper grounding pro dures.

1. With the power off and the line cord removed from the unit, place the monitor on its side and remove the four (4) screws from the bottom panel.



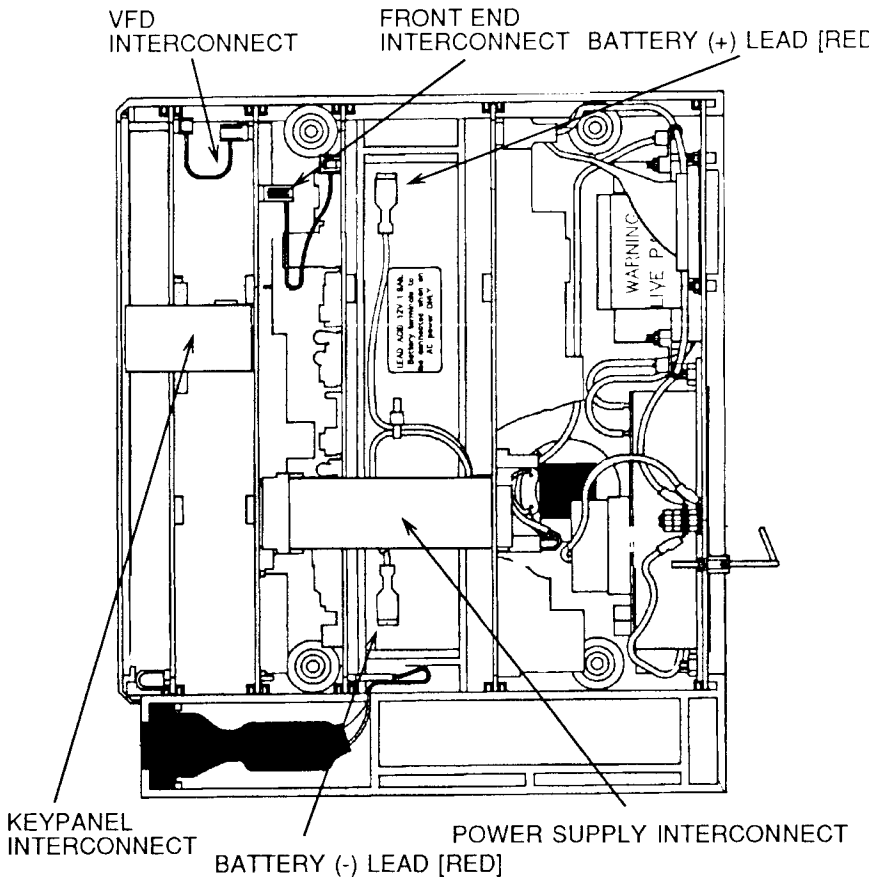
2. Place the monitor top side up and carefully lift the top cover off. This will expose the all the assemblies which can now

be easily removed once the interconnecting cables are disconnected.



3. To avoid possible damage to any of the internal electronics disconnect the battery before disassembling the monitor any further. *NOTE: This will erase all of the battery backed memory, when the monitor is powered up it will reset to factory default parameters.*

4. Each of the assemblies can be easily lifted up from the chassis.



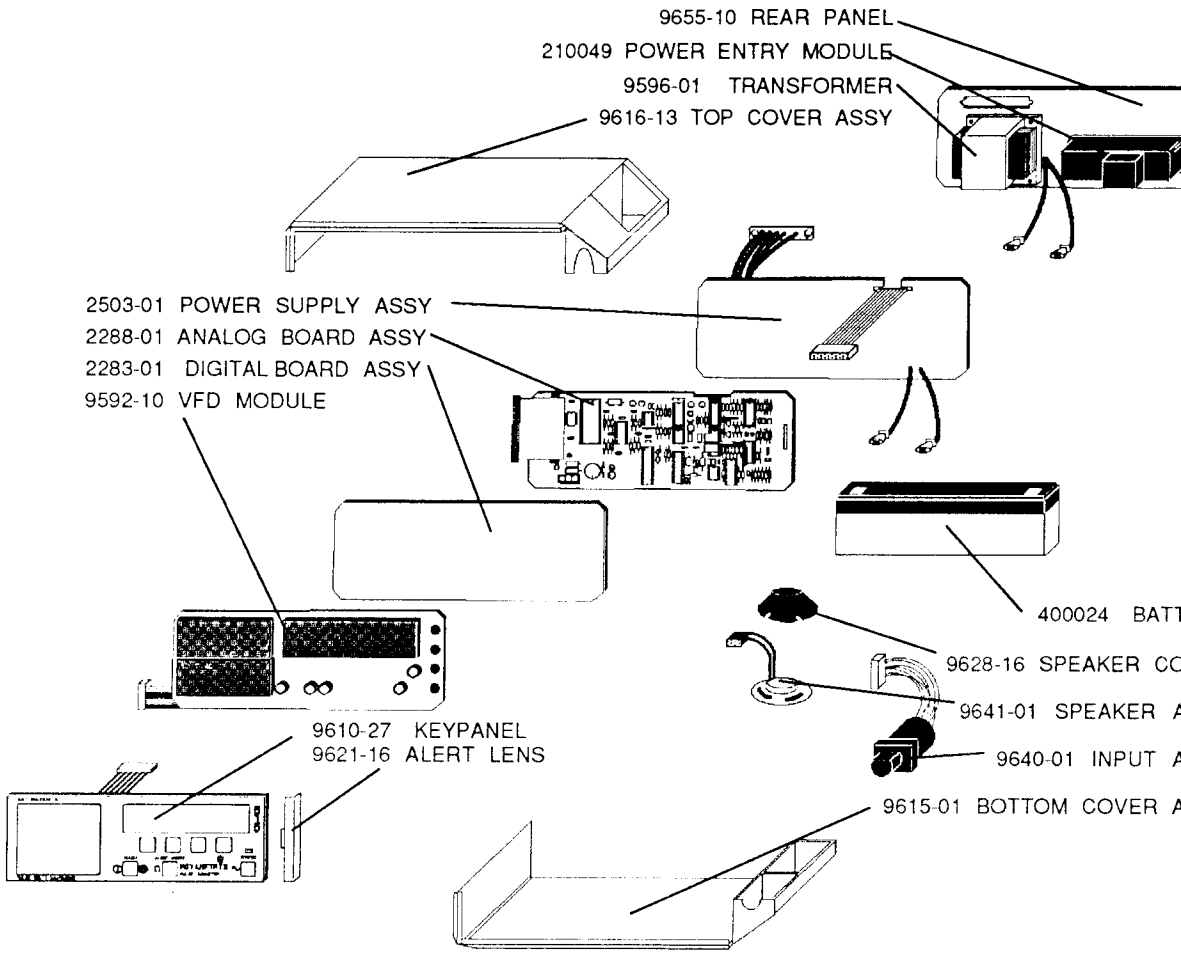
5.3 Assembly

When assembling the Model 515 ensure that the line cord is disconnect from the power entry module. If the battery is disconnected do not connect it the power supply board until all the boards are connected and the AC mai power is on (see instructions that follow).

1. Slide each board into its proper position on the bottom cover (chassis). Connect all the ribbon cables to the appropriate boards, *DO NOT CONNECT THE BATTERY AT THIS POINT!*
2. With all the assemblies properly connected (with the exception of the battery) check that the voltage setting on the power entry module is set correctly then connect the line cord. Place the mains switch to the | position, ensure that the ~ LED on the front panel illuminates.
3. Check that the voltage across the battery terminalleads from the 2503 board is +13.8 VDC ± 0.02. Connect the negative lead to the battery first, then connect the positive lead. Place

the mains switch to the O position, press the **POWER** button on the front panel and verify the unit powers up.

Assembly Diagram



6.0 Specifications

6.1 General

Below are specifications for the Novametrix Model 515 Pulse Oximeter. These specifications are listed for informational purposes only, and are subject to change without notice.

6.2 Oxygen Saturation (SaO_2 Section)

- Range, 0 - 100 %
- Accuracy (1 standard deviation),
  80 - 100 %, ±2 %,
  0 - 79 %, unspecified
- Display Resolution, 1%
- Averaging Time, User selectable times of 2, 4, 8, and 16 seconds
- Audible SaO_2 Trend Feature
  Pitch of (user selectable) Pulse Rate "beep" tracks the SaO_2 value (i.e., decreasing SaO_2 values are signalled by lower pitched "beeps") Sixteen (16) different pitches are linked to the upper SaO_2 alarm limit setting.
- Settling Time
  Display settles to within 1% of the final reading less than 15 seconds after the sensor is properly applied.
- Alerts
  User selectable high and low limits. Visible alarm is immediate. Audible alarm occurs after 10 seconds of continuous violation of the set limit. Limit values are retained in memory when monitor is turned off.

6.3 Pulse Rate (PR) Section

- Range, 30 - 250 beats per minute (bpm)
- Accuracy (1 standard deviation), ± 1% of full scale
- Display Resolution, 1 bpm
- Averaging Time, User selectable times of 2, 4, 8, and 16 seconds
- Settling Time
  Display settles to within 1% of the final reading less than 15 seconds after the sensor is properly applied.
- Alerts
  User selectable high and low limits. Visible alarm is immediate. Audible alarm occurs after 10 seconds of continuous violation of the set limit. Limit values are retained in memory when monitor is turned off.

6.4 General Specifications

- Operating Environment
  10 - 40° C (50 - 104° F)
  0 - 90% relative humidity (non-condensing)
- Weight
  approximately 10 lbs. (4.54 kg)
- Dimensions
  Height, 3.6 inches (9.14 cm)
  Width, 9.0 inches (22.86 cm)
  Depth, 10.25 inches (26.035 cm)
- Power
  100/120/220/240 Vac ±10%, 50/60 Hz
- Fuse Rating
  U.S. specification: 0.25 A, 250 V, Slow-Blow
  European specification: T 125 mA 250 V (x2)
- Battery
  Type, lead-acid gel-cell
  Battery Life, 2 hours
  (Note: Excessive alerting reduces battery life.)
  When 15 minutes of battery life remain, the "low battery" indicator starts to flash. When the battery becomes exhausted, the monitor shuts off. Connect to AC power to recharge battery. Battery fully recharged in 8 hours max.

6.5 Additional Features

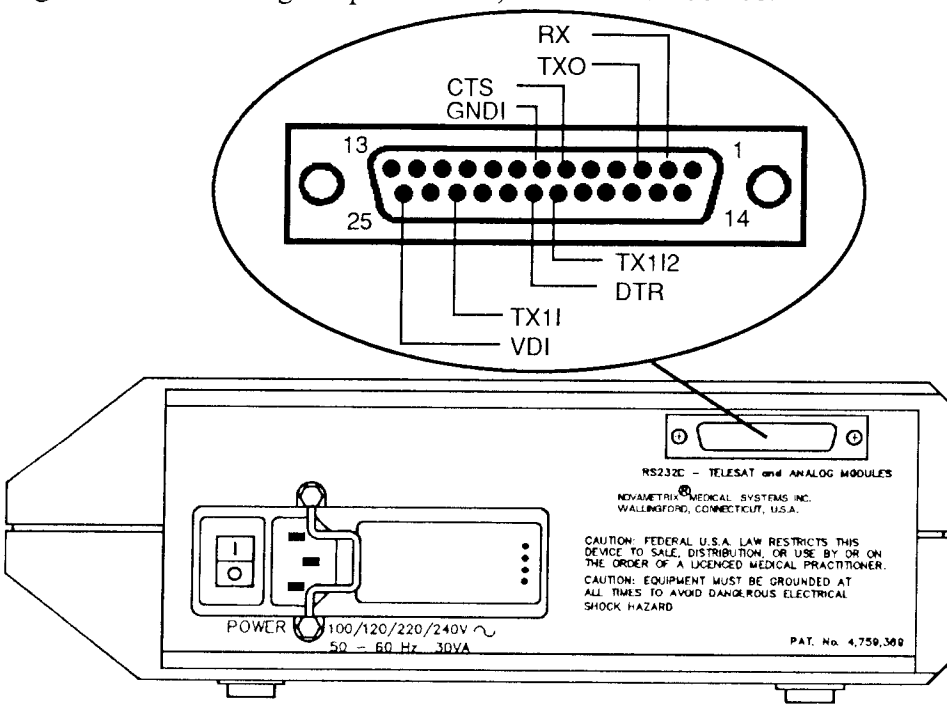
- 2 Minute Silence
  When AUDIO key is pressed, deactivates audible alerts for two minutes.
  Indicated by illuminated 2 MIN LED.
- Audio Off
  Press and hold AUDIO key for 3 seconds, will deactivate audible alerts.
  Indicated by flashing OFF LED.
- Trend Memory
  Trend memory print of 20 minutes, 2 hours, or 14 hours when used with Model 315 Printer.
- Analog (Recorder) Data Output
  Provides analog output for external strip chart applications at the following levels;
  Oxygen Saturation value, 10mV/% (100% = 1V)
  Pulse Rate value, 10mV/bpm (250bpm = 2.5V)
  Plethysmograph pulse waveform, 0-2.5V max (AGC)

Digital Data Output
Provides RS232 data output compatible with;
Novametrix Model 315 Printer
Novametrix Model 1010 Telemetry Central Station

7.0 Connecting External Equipment

7.1 RS232 Rear Panel Connector

The rear panel of the Model 515 Pulse Oximeter contains a 25 pin D nector for hookup to external devices which can be either analog recc (through use of an Analog Output Module) or an RS232 device.



The pinout of the RS232 connector is as follows;

Pin 2 ..... RX (Receive)
Pin 3 ..... TX0 (Transmit Out)
Pin 6 ..... CTS (Clear To Send)
Pin 7 ..... GNDI (Isolated Ground)
Pin 19 ..... TX1I2 (Transmit Out 0-5
Pin 20 ..... DTR (RS232 high level)
Pin 23 ..... TX1I (Transmit Out)
Pin 25 ..... VDI (+5 volts isolated)

There are different types of RS232 formats which the Model 515 car programmed for. To program the Model 515 for different RS232 formats

monitor must be powered up while simultaneously pressing the rightmost sof key (#4) and the **POWER** button. An options menu will appear;

OPTIONS MENU			
Opts	**Ser**	**clock**	**Run**

The softkey functions are:

Opts: Enters the special functions menu, for further information refer to the operating manual.

Ser: Enables selection of the RS232 option.

clock: Select time and date setting for viewing or programming.

Run: Sets the monitor to operate in normal mode.

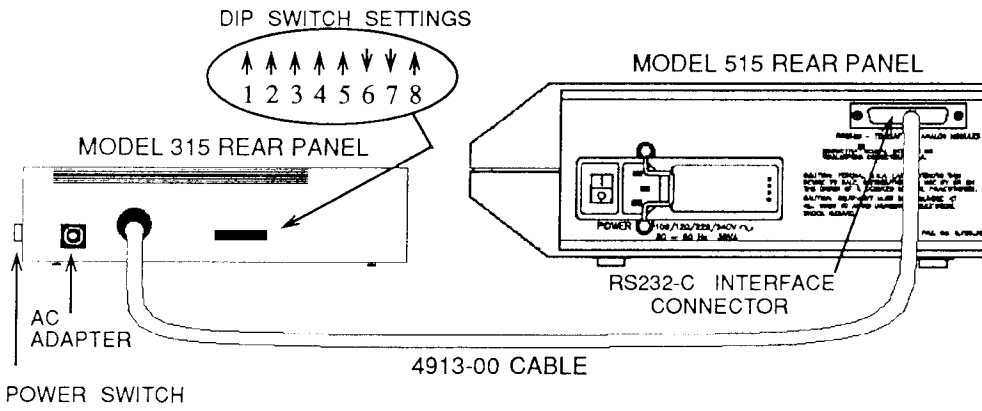
Selection of the **Ser** softkey in the menu displayed above will display th currently programmed RS232 format. The alternate types can be viewed b pressing the **Next** or **Prev** softkey, when the **Enter** softkey is pressed the dis played format will be programmed into the monitor and will remain the choic unless reprogrammed or should the monitor loose backup power (both mair *and* battery power removed from the unit). The RS232 format options availabl are;

- Full Format Mode: Default mode used for general purpose data collection.
- Saracap Interface: Connects to SARACAP® systems.
- Dräger Interface: Connects to Dräger® Centralert™ System.
- Printer Interface: Novametrix 315 or Hewlett-Packard ThinkJet Printers
- 1260/1010 Interface: Novametrix 1260 Capnograph or 1010 telemetry system.

NOTE: For further information on RS232 formats and interfaces reference the operating mar ual.

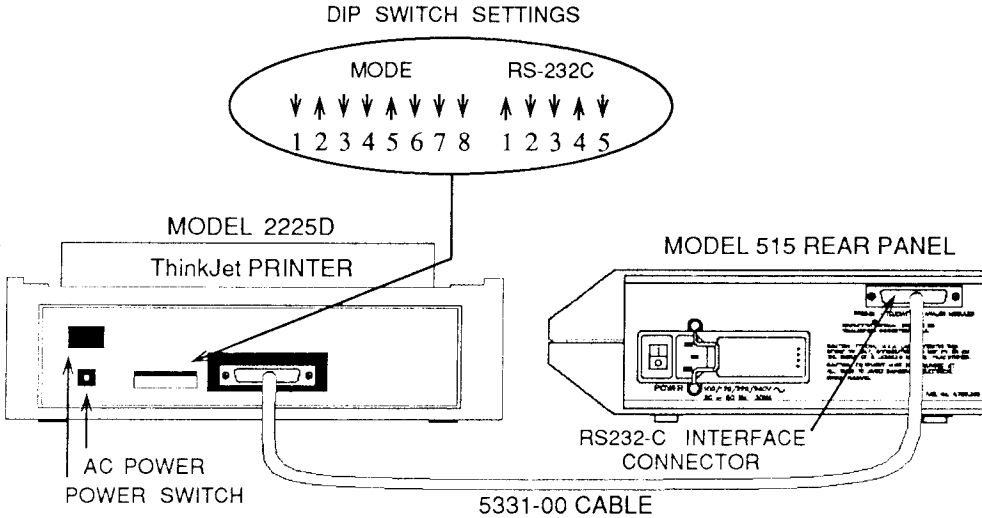
7.2 Model 315 Printer Interface

The Model 315 printer is easily connected to the Model 515 Pulse O: ter through the use of the 4913-00 interface cable. Ensure that the DIP sv es on the Model 315 are set as indicated below for proper operation, refe the Operating manuals for more information.



7.3 Think Jet Printer Interface

The Think Jet printer is easily connected to the Model 515 Pulse Oxi through the use of the 5331-00 interface cable. Reference the Operating m als for more information.



7.4 Analog Output Module

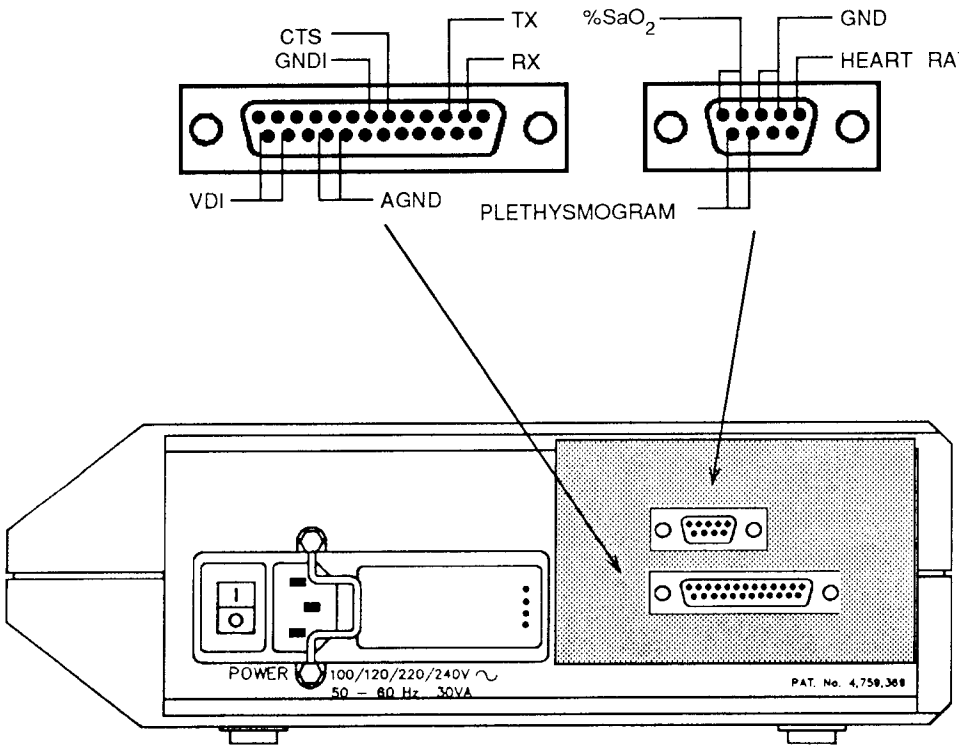
In order to connect the Model 515 Pulse Oximeter to an analog recor device (i.e. strip-chart recorder) the 2289-00 Analog Output Module is quired. This device plugs into the Model 515 rear panel 25 pin D-connecto produces three analog output voltages on a 9 pin D-connector which c

spond to heart rate, % SaO2 and plethysmogram waveform outputs. In additic to the analog waveforms an RS232 output line is also available from a sep rate 25 pin D-connector.

Analog Output Module Pinout

Pin	Description	Output Voltage
1	Heart Rate: 0 - 250 beats/min	0 - 2.5 volts
2,3	Ground (isolated)	
4,5	%SaO2: 0 - 100%	0 - 1 volt
6,7	Not used	
8,9	Plethysmogram waveform	0 - 2.5 volts

The Analog Output Module plugs directly onto the 25 pin D-connector l cated on the rear panel of the Model 515. It receives power and all of the si nals from this connection. The analog output levels are derived from dedicated serial line which is found on pin 19 (TXI2) of the rear panel conne tor. The second RS232 line is hardwired from the monitor's rear panel conne tor to the Analog Output Module's 25 pin D-connector.



The output levels of the analog outputs can be set to 0, 1/2, or full scale b using one of the monitor's internally programmed special functions. With th monitor off, simultaneously press the third softkey from the left and the **POW**

ER key. The following display will appear;

RECORDER OUTPUTS			
Ø	**1/2**	**MAX**	**RUN**

The softkeys functions are:

Ø: Sets the three analog outputs to their respective 0 (zero) values.

1/2: Sets the three analog outputs to their mid-scale values.

MAX: Sets the three analog outputs to their maximum values.

RUN: Exits the RECORDER OUTPUT menu and the monitor operates in normal mode.

8.0 Troubleshooting Guide

8.1 Monitor Error Messages

Monitor error messages may appear at power up or during normal ope tion of the monitor. A self test is automatically performed each time the unit powered up, if any failures occur an error message will be displayed on t DOT matrix display and the unit will be rendered inoperative until the probl is rectified. Other error messages may occur during operation of the monitor ter the self test, these may be "fatal" errors which impede the monitor's op ation, or they may be "non-fatal" which can be rectified by the user to retu the monitor to normal operation.

Self Test

During the monitor's self test various diagnostic checks are made a checked by the processor to verify the monitor is in good operational conditi There are four tests which are run and must pass before the unit will oper as normal, should one of these test fail and error message will be displa with the test number and an error code. The four tests performed are listed b low.

Test:1 Error Code 0:

This is a RAM test, values are written to RAM and read back at each RAM location. In order to pass the value read back must be the same as the value written. [IC4 and IC6 on the 2283 Digital board].

Test:2 Error Code 0:

This test checks the DC calibration levels and verifies that they are within acceptable limits. [Inputs to IC11 on the 2288 Analog board].

Test:3 Error Code 0:

This test checks the checksum values stored in EEPROM (E^2PROM) which is located on the 2288 Front End Board [IC10] with the checksum values stored in EPROM (IC3 located on the 2283 Digital Board). This error may occur when the EEPROM is defective or if new software has been installed. In the latter case the monitor will automatically perform a self calibration procedure, if successful the monitor will operate as normal otherwise the calibration procedure will continue until it passes. If the monitor continually fails the self calibration then the monitor is in need of service.

Test4 Error Code 0:

This test checks the E^2PROM (IC10 on the 2288 Analog boar for the stored battery monitoring values which are programme at the factory. These values are checked against certain limits, they fall within these limits then the test will pass. If the valu are not within the limits then new values will have to b programmed in before the monitor can be operational.

Run Mode Errors

Error messages may be displayed during normal operation of the moni the processor detects any failures. These errors will be displayed on the matrix display as "MONITOR ERROR-XXXX" where XXXX will be a number responding to a specific error code. If one or more errors occur the sum of code numbers will be displayed, i.e. if error codes Ø1 and Ø2 are detected "MONITOR ERROR-ØØØ3" will be displayed. The error codes are listed below

Ø1 Fuse on the 2288 Front End Board blown or failure of IC24 on Front End Board.

Ø2 250 msec interrupt overrun. This is a display averaging routine which monitors display values and compares them against the user set limits. It also controls trending.

Ø4 5 msec interrupt overrun.

Ø8 Stack overrun error.

1Ø Stack top error

2Ø Watchdog failure. This is a software generated NMI.

4Ø Illegal memory mapping. Monitor is not addressing run time memory.

8Ø Illegal interrupt request.

Status Errors

These are messages which prevent the monitor from calculating any S or Resp Rate values. These errors relate the condition of the probe an most cases can be alleviated by proper application of the probe.

CONNECT 87XX PROBE: SuperBright™ sensor has not been attached to the monitor

PROBE OFF PATIENT: Sensor is connected but not attached to patient.

INCOMPATIBLE PROBE: A non-SuperBright™ probe has been attached to the monitor.

PROBE ERROR Ø2: Red LED in sensor has failed.

PROBE ERROR Ø4: Ir LED in sensor has failed.

LOW SIGNAL STRENGTH: The measured signal is too small to give accurate calculations.

INSUFFIC. LIGHT XX: Not enough light from the LEDs is getting through to the detector in the sensor. XX - increments in seconds as long as the condition exists.

LIGHT INTERF. XX: Too much ambient light is being detected by the sensor. XX - increments in seconds as long as the condition exists.

Battery Operation Messages

When the monitor is operating under battery power certain indicators a messages will be displayed depending upon the condition of the battery. Wh the battery level reaches approximately 11.8 volts the red LED on t front panel will illuminate. This will not affect the operation of the monitor. the battery discharges to 10.5 volts "BATTERY EXHAUSTED CONNECT LI CORD" will appear on the display along with an alert condition. At this po the line cord should be attached and the rear panel mains switch should be the | position to allow the battery to charge up. If the battery is allowed to d charge to 10.0 volts the display will blank out and the red LED will fla at a slow rate. To return the monitor to normal operation the AC supply m be applied and the unit powered up again, the battery must be charged up in der for battery operation to resume.

9.0 Parts Lists

The following pages list part lists for the individual assemblies and final as blies for the Model 515 Pulse Oximeter. The Novametrix part number along with pertinent revision level is listed along with a description of the part used.

9.1 ASSY: 9593-00 01 MODEL 515 - PULSE OXIMETER MONITOR

LINE	P/N	REV	QPA	DESCRIPTION
0001	1003-32	02	1	SERIAL NO. LABEL
0002	1217-32	02	1	REPAIR LABEL
0003	4470-32	00	1	LABEL, CAUTION GROUNDING
0004	4509-32	00	1	WARRANTY LABEL
0005	9581-32	00	1	LABEL, FUSE RATING, 35VA, 1/2A SLO BLO
0006	9593-01	01	1	MAIN ASSY, MODEL 515
0007	9644-32	01	1	LABEL, WARNING, EXPLOSION HAZARD, MODEL 515
0008	9684-32	00	1	LABEL, ISOLATION, MODEL 515
0009	315032		1	LABEL,"120 VAC" 10 X 20 MM BLK LETTERS,YEL BACKROUND
0010	600026		1	LINE CORD,7 1/2 FT,HOSP GR PLUG & BUS MACHINE

9.2 ASSY: 9593-01 01 MAIN ASSY, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	9615-01	01	1	BOTTOM COVER ASSY, MODEL 515 ✓
0002	9616-13	02	1	TOP HALF SCREENED, MODEL 515
0003	9621-16	01	1	LENS, ALERT, MODEL 515 ✓
0004	161067		0	TAPE, CL CELL, POLYCHLOROPRENE
0005	285001		0	#6 INTERNAL TOOTH LOCK WASHER
0006	286205		0	6-32 X 3/4 S.B.H. CAD PLATED
0007	320012		0	POLYETHELENE TAPE

9.3 ASSY: 9615-01 01 BOTTOM COVER ASSY, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	2283-01	01	1	DIGITAL BOARD ASSY, MODEL 515
0002	2288-01	01	1	ANALOG BOARD ASSY, MODEL 515
0003	2503-01	01	1	PSU BD ASSY, MODEL 515
0004	9592-10	00	1	VFD MODULE, MODEL 515
→ 0005	9610-27	03	1	KEYPANEL, MODEL 515
0006	9611-32	01	1	REAR FACE PLATE, MODEL 515
0007	9615-13	02	1	BOTTOM HALF SCREENED, MODEL 515
0008	9624-16	00	5	LED REFLECTOR, MODEL 515
0009	9628-16	01	1	SPEAKER COVER, MODEL 515
0010	9640-01	01	1	INPUT ASSY, MODEL 515
0011	9641-01	00	1	SPEAKER ASSY, MODEL 515
0012	9655-01	01	1	ASSEMBLY REAR PANEL, MODEL 515
0013	9658-01	00	1	WIRE C ASSY, MODEL 515
0014	9659-32	00	1	LABEL, BATTERY, MODEL 515
0015	161058		0	TAPE, COPPER SHIELDING, 3/4 WIDE, SELF ADHESIVE
0016	161059		0	TAPE, FOAM, POLTHN, 20MM X 5MM, SELF ADHESIVE
0017	161066		0	TAPE, FOAM, DOUBLE-SIDED, 1(25) X .5(12) X .03(8) T
0018	240049		4	FOOT, MLD, WH, SELF ADH, .50(12.7)D X .14(3.57)H
0020	280103		2	LOCKING SCREW KIT

0021	281501	0	6-32 HEXNUT MACHINE SCREW-STEEL CADMIUM
0022	315052	1	LABEL, EARTHING SYMBOL
0023	400024	1	BATTERY, 12V, 1.9 AMP HOUR, LEAD ACID
0024	608001	0	CABLE TIE, .094 X 3.62L, SELF-LKG, 1/16 TO 5/8 BDL

9.4 ASSY: 2283-01 01 DIGITAL BOARD ASSY, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	2283-02	01	1	FAB, DIGITAL BOARD, MODEL 515
0002	2283-03	01	0	SCHEMATIC, DIGITAL BOARD, MODEL 515
0003	9671-07	11	1	PROGRAM EPROM ASSY, MODEL 515
0004	152070		1	CAP, 1000UF, 10V, 20%, ELCTLT, RADIAL, .2 SPACING
0005	152072		1	CAP, 10UF, 50V, 20%, ELCTLT, MICROMIN, .1 SPACING
0006	152073		3	CAP, 100UF, 6.3V, 20%, ELCTLT, MICROMIN, .1 SPACING
0007	153003		1	CAPACITOR, .01UF,50V, O.1 PITCH, X7R
0008	153006		1	CAPACITOR, 47PF, 0.1" PITCH 63V
0009	153012		2	CAPACITOR,22PF
0010	153013		2	CAPACITOR, 33PF
0011	154016		31	CAPACITOR, .1UF, 50V, .100 SP, MULTILYR CERAMIC
0012	153051		1	CAPACITOR, .22UF, 50V, 20%, .1(2.54)SP, MLTLY
0013	154054		1	CAPACITOR, 6800PF, 200V, 10%, .1 SPACING, MUL
0014	161038		0	FOAM TAPE,1/2"W X 3/4"L,DOUBLE-SIDED ADHESIVE
0015	210097		1	CONNECTOR, 16 PIN, HEADER, DIL, .1 SPACING, SPACING
0016	211914		1	CONNECTOR, 9 PIN, HEADER, SIL, .1 SPACING, STR
0017	212501		1	20 PIN CONNECTOR I/O HEADER
0018	213401		1	40 PIN BREAKAWAY P.C. MOUNT
0019	215042		1	SOCKET, 28 PIN, TURNED, DUAL IN LINE
0020	215060		1	SOCKET, IC, 32 PIN, DIP, .6 SPACING
0021	215064		1	SOCKET, IC, 64 PIN, .070 SPACING
0022	230015		1	CRYSTAL, 9.216MHZ, HC49/U CASE, .2 SPACING
0023	230016		1	CRYSTAL, 32.768K HZ
0024	470021		1	RESISTOR, 56 OHM, 1/4W, 10%, CARBON
0025	470081		1	RESISTOR, 5.6M OHM, 1/4W, 10%, CARBON
0026	472000		1	RESISTOR, 10 OHM, 1/4W, 1%, CARBON
0027	472003		3	RESISTOR, 100 OHM, 1/4W, 1%, CARBON
0028	472011		1	RESISTOR, 1K OHM, 1/4W, 1%, CARBON
0029	472030		2	RESISTOR, 10K OHM, 1/4W, 1%, CARBON
0030	472062		1	RESISTOR, 15OK 0HM, 1/4W, 1%, CARBON
0031	472204		1	RESISTOR, 1 OHM, 1/4W, 1%
0032	474076		2	RESISTOR PACK, 100K OHM, 7 RES, 8 PIN, 1 COMMON
0033	481501		4	DIODE, 1N4148, SILICON, GENERAL PURPOSE SIGNAL
0034	481534		1	DIODE, BAT85, SCHOTTKY, MINIATURE, DO-34 PACK
0035	483011		2	PNP TRANSISTOR ZTX214C
0036	486255		1	IC, SN76496N, TONE GENERATOR
0037	486256		1	IC, HM62256LP-12, 32K STATIC RAM
0038	486260		2	IC, CD4017, CMOS DECADE COUNTER/DIVIDER
0039	486285		1	IC, HD64180R1P6, HIGH INTEGRATION CMOS 8-BIT
0040	486286		1	IC, MM74HC10N, TRIPLE 3-INPUT NAND GATE
0041	486287		1	IC, MM74HC245N, OCTAL TRI-STATE TRANSCEIVER
0042	486288		1	IC, MM74HC541N, OCTAL TRI-STATE BUFFER
0043	486289		2	IC, CD4025BC, TRIPLE 3-INPUT NOR GATE
0044	486290		1	IC, CD4072BC, DUAL 4-INPUT OR GATE
0045	486604		1	MC14040B 12 STAGE BINARY COUNTER
0046	486625		4	MC74HC32N I.C. QUAD 2 INPUT OR GATE

0047	486628	1	MM74HC244N I.C. OCTAL TRI STATE BUFFER
0048	486642	1	MM74HC04 I.C. CMOS HEX INVERTER
0049	486648	1	CD4024BE I.C. 7 STAGE RIPPLE COUNTER
0050	486651	1	MM74HC138 I.C. 3 TO 8 LINE DECODER
0051	486671	1	IC, CMOS DUAL 4 INPUT & GATE, 74HC21
0052	486675	1	MM74HC14N, IC,CMOS
0053	486676	2	MM74HC74N, IC, CMOS
0054	486680	1	MM74HC573N, IC, CMOS
0055	486699	1	IC, MC146818P, REAL-TIME CLOCK/RAM
0056	487061	1	IC, TBA820M, MONOLITHIC INTEGRATED AUDIO AMP
0057	606400	0	#22 BUSS WIRE
0058	180011	1	FERRITE BEAD, 22 AWG TCW WIRE THRU CORE, 1 TURN
0059	180012	1	FERRITE BEAD, .138(3.5)OD, .031(.8)ID, .175(4.5)L

9.5 ASSY: 2288-01 01 ANALOG BOARD ASSY, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	2288-02	01	1	FAB, ANALOG BOARD, MODEL 515
0002	2288-03	01	0	SCHEMATIC, ANALOG BOARD, MODEL 515
0003	9646-01	00	1	RIBBON CABLE B ASSY, MODEL 515
0004	152040		2	CAPACITOR, 2.2UF, 35V, TANTALUM
0005	152048		2	CAPACITOR, 4.7 UF,16V.
0006	152067		2	CAPACITOR, 100UF, 16V, TANTALUM
0007	152041		0	CAPACITORS 470UF, 16V
0007	152058		1	CAPACITOR, 470UF, 16V, RADIAL, .2" PITCH, ELCT
0008	152071		1	CAP, 6.8UF, 50V, 20%, ELCTLT, MICROMIN, .1 SPACING
0009	152072		1	CAP, 10UF, 50V, 20%, ELCTLT, MICROMIN, .1 SPACING
0010	153006		1	CAPACITOR, 47PF, 0.1" PITCH 63V
0011	153013		3	CAPACITOR, 33PF
0012	153019		1	CAPACITOR, .047UF, 50V, +80%, -20%, .1 PITCH
0013	153031		1	CAPACITOR, 100PF, 100V, 2%
0014	153046		1	CAPACITOR, 4700PF, 100V, 10%, CERAMIC PLATE
0015	154016		32	CAPACITOR, .1UF, 50V, .100 SP, MULTILYR CERAMIC
0016	154032		2	CAPACITOR,1UF,63V.,10%, POLYESTER
0017	154035		1	CAPACITOR, 10PF, CERAMIC PLATE
0018	154037		4	CAPACITOR, .1UF, 20%, POLYESTER, .1(2.5) SPACING
0020	154028		2	CAP, .22UF, 63V, +/- 5%, .200(5.1MM)SP, MET POLY
0021	161044		0	ADHESIVE, TAK 410, BLACK
0022	180004		3	CHOKE 100UH
0023	211711		1	CONNECTOR, 7 PIN, HEADER, SIL, .1 SPACING, STR
0024	215006		2	IC SOCKET 16 PIN
0025	215016		5	14 PIN SOCKET
0026	215018		1	IC SOCKET 28 PIN
0027	215019		3	IC SOCKET 8 PIN
0028	215031		1	IC SOCKET, 20 PIN
0029	215043		1	SOCKET, 24 PIN, .3 PITCH, TURNED, DUAL IN LINE
0030	472003		4	RESISTOR, 100 OHM, 1/4W, 1%, CARBON
0031	472022		1	RESISTOR, 4.99K OHM, 1/4W, 1%, CARBON
0032	472023		1	RESISTOR, 5.11K OHM, 1/4W, 1%, CARBON
0033	472030		4	RESISTOR, 10K OHM, 1/4W, 1%, CARBON
0034	472032		1	RESISTOR, 11K OHM, 1/4W, 1%, CARBON
0035	472036		1	RESISTOR, 13.3K OHM, 1/4W, 1%, CARBON
0036	472043		1	RESISTOR, 24.9K OHM, 1/4W, 1%, CARBON
0037	472053		2	RESISTOR, 64.9K OHM, 1/4W, 1%, CARBON

0038	472057	1	RESISTOR, 90.9K OHM, 1/4W, 1%, CARBON
0039	472058	16	RESISTOR, 100K OHM, 1/4W, 1%, CARBON
0040	472065	8	RESISTOR, 200K OHM, 1/4W, 1%, CARBON
0041	472070	1	RESISTOR, 402K OHM, 1/4W, 1%, CARBON
0042	472071	2	RESISTOR, 470K OHM, 1/4W, 1%, CARBON
0043	472075	1	RESISTOR, 1M OHM, 1/4W, 1%, CARBON
0044	472097	2	RESISTOR, 147K OHM, 1/4W, 1%, CARBON
0045	472113	1	RESISTOR, 2.43K OHM, 1/4W, 1%, CARBON
0046	472146	2	RESISTOR, 47.5K OHM, 1/4W, 1%
0047	472055	1	RESISTOR, 80.6K OHM, 1/4W, 1%, CARBON
0048	472179	1	RESISTOR, 24.3K OHM, 1/4W, 1%, 50 PPM
0049	472188	1	RESISTOR, 5.49K OHM, 1/4W, 1%
0050	472198	1	RESISTOR, 3.3 OHM, 1/4W, 1%, CARBON
0051	472199	2	RESISTOR, 9.76K OHM, 1/4W, 1%
0052	472200	1	RESISTOR, 5.6 OHM, 1/4W, 1%
0053	472201	2	RESISTOR, 78.7K OHM, 1/4W, 1%
0054	470008	2	RESISTOR, 4.7 OHM, 1/4W, 10%, CARBON
0055	472263	1	RESISTOR, 2.74K OHM, 1/4W, 1%
0056	472264	1	RESISTOR, 1.47K OHM, 1/4W, 1%
0057	474077	2	RESISTOR, ZERO OHM, 1/4W SIZE
0058	481000	1	DIODE, ZENER, ICL8069CCQ, 1.2V TEMP V REF
0059	481501	3	DIODE, 1N4148, SILICON, GENERAL PURPOSE SIGNAL
0060	484014	2	NPN TRANSISTOR ZTX109C
0061	484529	2	VOLTAGE REGULATOR, LM78L05ACZ, 5V, 100MA
0062	485510	4	VN10LM VMOS F.E.T.
0063	486028	1	IC, NMC9346NE, 1024-BIT E2PROM, 64 RGTR
0064	486268	2	IC, DG211, QUAD ANALOG SWITCH
0065	486284	1	IC, SI8601DJ, 8 CHANNEL 8-BIT CMOS DATA AQUISITION
0066	486293	1	IC, PM-7528HP, CMOS INTERFACE
0067	486712	4	TLO74CN QUAD F FET LOW OFF SET OP AMP
0068	486716	1	LM393N DUAL COMPARATOR
0069	486744	1	I.C., TLO72 DUAL OP AMP JFET INPUT
0070	486771	1	IC, AD7537KN, DUAL 12-BIT D TO A CONVERTER
0071	486772	1	IC, LMC660CN, QUAD OP AMP, CMOS, 5V TO 16V
0072	487053	1	IC, AD712, PRECISION DUAL BIFET OP AMP
0073	515042	1	FUSE, 1/10A, 250V, FAST-BLO, 3AG
0074	515507	2	FUSE CLIP (DUAL)
0075	605104	0	#24 STRANDED WIRE, BROWN
0076	608004	0	TUBING, HEAT SHRINK, 3/32" DIA, BLACK
0077	608080	0	HEATSHRINK, 2.4MM, BLACK
0078	472011	1	RESISTOR, 1K OHM, 1/4W, 1%, CARBON
0079	481534	1	DIODE, BAT85, SCHOTTKY, MINIATURE, DO-34 PACK
0080	472156	1	RESISTOR, 267K OHM, 1/4W, 1%

9.6 ASSY: 9646-01 00 RIBBON CABLE B ASSY, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	213406		1	CONN, 40 PIN, SOCKET, DIL, INSULATION DISPLACEMENT
0002	213407		1	CONN, 40 PIN, PLUG, DIL, INSULATION DISPLACEMENT
0003	600030		1	RIBBON CABLE, 40 CONDUCTOR, 28AWG, WITH RED TRACER

9.7 ASSY: 2503-01 01 PSU BD ASSY, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	2503-02	02	1	FAB, PSU BOARD, MODEL 515

0002	9597-10	00	1 FERRITE TRANSFORMER, MODEL 515
0003	9681-10	00	1 CHOKE, TOROID, 5 MH
0004	9682-01	00	1 PSU CABLE ASSEMBLY, 20 PIN, MODEL 515
0005	9683-01	01	1 PSU CABLE ASSEMBLY, 10 PIN, MODEL 515
0006	9686-01	00	1 BATTERY WIRE ASSEMBLY, RED, MODEL 515
0007	9687-01	00	1 BATTERY WIRE ASSEMBLY, BLACK, MODEL 515
0008	152040		4 CAPACITOR, 2.2UF, 35V, TANTALUM
0009	152045		4 CAPACITOR, 10UF 16V 0.2" PITCH
0010	152074		1 CAPACITOR, 1000UF, 16V, 20%, AL, ELCTLT, RADIAL
0011	152075		1 CAPACITOR, 47UF, 25V, 20%, AL, ELCTLT, RADIAL
0012	152076		3 CAPACITOR, 1500UF, 25V, 20%, AL, ELCTLT, RADIAL
0013	152077		1 CAPACITOR, 10000UF, 35V, 20%, AL, ELCTLT, RAD
0014	152078		1 CAPACITOR, 2200UF, 25V, 20%, AL, ELCTLT, RDL
0015	153037		2 CAPACITOR, 470PF, 50V, 5%, .1 PITCH, SHORT LEAD
0016	154016		11 CAPACITOR, .1UF, 50V, .100 SP, MULTILYR CERAMIC
0017	154041		1 CAPACITOR, .01UF, 1%, 63V, POLYSTYRENE
0018	154056		1 CAPACITOR, 2200PF, 160V, 1%, POLYSTYRENE, AXIAL
0019	154057		1 CAPACITOR, 470PF, 100V, 10%, .2(5) SP, POLYCARB.
0020	154058		1 CAPACITOR, .022UF, 100V, 10%, .2 SP, MET POLY
0021	154059		1 CAPACITOR, .047UF, 63V, 10%, .2 SP, MET POLY
0022	154060		1 CAPACITOR, .22UF, 63V, 10%, .2(5) SP, MET POLY
0023	161018		0 HOT MELT, SUPERSTICK
0024	180010		1 INDUCTOR, 18UH, 10%, PC MOUNT, .2 (5) SPACING
0025	211222		1 CONNNECTOR, 2 PIN, HEADER, LOCKING, PC MNT
0026	211314		1 CONNECTOR, 3 PIN, HEADER, LOCKING, PC MOUNT
0027	216058		1 TERMINAL LUG, .189(4.8) MALE, PC MOUNT
0028	260014		1 HEATSINK, BLACK ANODISED
0029	260015		1 MOUNTING CLIP, HEATSINK
0030	310009		1 INSULATOR, TO-220
0031	470110		1 RESISTOR, .22 OHM, 1/2W, 10%, METAL FILM
0032	470111		4 RESISTOR, .33 OHM, 1/2W, 10%, METAL FILM
0033	471400		1 RESISTOR, 100M OHM, 1W, 5%, .9 PITCH
0034	472003		2 RESISTOR, 100 OHM, 1/4W, 1%, CARBON
0035	472007		6 RESISTOR, 475 OHM, 1/4W, 1%, CARBON
0036	472011		2 RESISTOR, 1K OHM, 1/4W, 1%, CARBON
0037	472021		2 RESISTOR, 4.75K OHM, 1/4W, 1%, CARBON
0038	472030		2 RESISTOR, 10K OHM, 1/4W, 1%, CARBON
0039	472034		1 RESISTOR, 12.1K OHM, 1/4W, 1%, CARBON
0040	472058		9 RESISTOR, 100K OHM, 1/4W, 1%, CARBON
0041	472065		1 RESISTOR, 200K OHM, 1/4W, 1%, CARBON
0042	472085		1 RESISTOR, 8.25K OHM, 1/4W, 1%, CARBON
0043	472121		1 RESISTOR, 3.74K OHM, 1/4W, 1%, CARBON
0044	472140		2 RESISTOR, 332K OHM, 1/4W, 1%
0045	472146		6 RESISTOR, 47.5K OHM, 1/4W, 1%
0046	472170		2 RESISTOR, 22.1K OHM, 1/4W, 1%
0047	472225		1 RESISTOR, 68 OHM, 1/4W, 1%, METAL FILM
0048	472266		1 RESISTOR, 2.7K OHM, 1/4W, 1%, METAL FILM
0049	472267		2 RESISTOR, 22 OHM, 1/4W, 1%, METAL FILM
0050	472268		1 RESISTOR, 8.66K OHM, 1/4W, 1%, METAL FILM
0051	472270		1 RESISTOR, 1.2M OHM, 1/4W, 1%, METAL FILM
0052	474112		1 RESISTOR, 5.6 OHM, 4W, 5%, .6(15.2) SP, WIREW
0053	475033		1 POTENTIOMETER, 1K OHM, 1 TURN, TOP ADJ, PC MOUNT
0054	475034		1 POTENTIOMETER, 2K OHM, 1 TURN, TOP ADJ, PC MOUNT
0055	475036		1 POTENTIOMETER, 50K OHM, 1 TURN, SIDE ADJ, PC

0056	481004	1	10V DIODE (ZENER)
0057	481022	1	DIODE, ZENER, BZY88C12, 12V, 500MW
0058	481028	1	DIODE, ZENER, BZV85C10, 10V, 1W, 5%, DO-41
0059	481501	1	DIODE, 1N4148, SILICON, GENERAL PURPOSE SIGNAL
0060	481516	2	DIODE, 11DQ03, SCHOTTKY
0061	481523	4	DIODE, 1N4002, RECTIFIER, 100V
0062	481536	2	DIODE, 1N5400, 50V, 3A
0063	481537	1	DIODE, BRIDGE RECTIFIER, 2KBP02, 2A, 200V
0064	483011	2	PNP TRANSISTOR ZTX214C
0065	484529	1	VOLTAGE REGULATOR, LM78L05ACZ, 5V, 100MA
0066	484531	1	VOLTAGE REGULATOR, 78M05CKC, +5V, 500MA
0067	485510	3	VN10LM VMOS F.E.T.
0068	485520	1	TRANSISTOR, BS250, P-CHANNEL MOSFET
0069	485527	1	MOSFET, IRF9523, .8 OHMS, 60V, P-CHANNEL
0070	485528	1	MOSFET, IRF540, .085 OHMS, 100V, N-CHANNEL
0071	486276	1	IC, DS232CPE, DUAL RS-232-C RECEIVER/TRANSMIT
0072	486600	1	IC, CD4013B, DUAL D-TYPE FLIP FLOP
0073	486606	1	CD4093BE QUAD 2 INPUT NAND GATE, VDD=-.5
0074	487062	1	IC, ICL7663CPA, PROGRAMMABLE MICROPWR VOLTAGE
0075	487063	1	IC, L4962, POWER SWITCHING REGULATOR, 1.5A
0076	487064	4	IC, CNY17-III, PHOTON COUPLED ISOLATOR
0077	487065	1	IC, UC3843N, CURRENT MODE PWM CONTROLLER
0078	515060	1	FUSE, 2.5A, 125V, SUBMINIATURE, PC MOUNT, AXIAL
0079	515061	3	FUSE, .75A, 125V, SUBMINIATURE, PC MOUNT, AXIAL
0080	2503-03 01	0	SCHEMATIC, PSU BOARD, MODEL 515
0081	152065	1	CAPACITOR, 10UF, 25V, TANTALUM
0082	515046	1	FUSE, 2 AMP, 250V, SLO-BLO, IEC127-II
0083	515507	2	FUSE CLIP (DUAL)
0084	608079	0	HEATSHRINK, 9.5MM, BLACK

9.8 ASSY: 9683-01 01 PSU CABLE ASSEMBLY, 10 PIN, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	210104		8	CONTACT, FEMALE, 28-24AWG, SOLDER
0002	212119		1	CABLE TERMINATOR, 10 PIN, PC MOUNT, INS DISPL
0003	212605		1	CONNECTOR, 24 PIN, HEADER, DUAL IN LINE, .3 PITCH
0004	600024		0	RIBBON CABLE, 10 CONDUCTOR
0006	608094		0	TUBING, HEATSHRINK, 3.2MM ID, BLACK

9.9 ASSY: 9686-01 00 BATTERY WIRE ASSY, RED, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	216051		1	TERMINAL, RECEPTACLE, INSUL, .187, 22-18AWG
0002	605253		0	#18 HOOKUP WIRE, RED
0003	608104		1	CABLE MARKER, WHITE, LEGEND: "+"

9.10 ASSY: 9687-01 00 BATTERY WIRE ASSY, BLACK, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	216051		1	TERMINAL, RECEPTACLE, INSUL, .187, 22-18AWG
0002	605250		0	#18 HOOKUP WIRE, BLACK
0003	608105		1	CABLE MARKER, WHTIE, LEGEND: "-"

9.11 ASSY: 9615-13 02 BOTTOM HALF SCREENED, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	9615-16	00	1	BOTTOM HALVE MOULDING, MODEL 515

9.12 ASSY: 9640-01 01 INPUT ASSY, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	9620-16	01	1	HOUSING, SENSOR, MODEL 515
0002	161007		0	SUPERBONDER 414 ADHESIVE
0003	180009		1	FERRITE SLEEVE, SHIELD, .25(6.35) DIA MAX CAB
0004	210103		0	CONTACT, FEMALE, 22-30AWG, CRIMP, TIN-LEAD
0005	211704		1	CONNECTOR, RCPT, 7 PIN, PNL MOUNT, WITH HARDWARE
0006	211712		1	CONNECTOR, 7 PIN, HOUSING, SIL, STRAIGHT
0007	600024		0	RIBBON CABLE, 10 CONDUCTOR
0008	608005		0	TUBING, HEAT SHRINK, 1/16" DIA, BLACK
0009	608014		0	TUBING, HEAT SHRINK, BLK, .750 ID, .030 WALL

9.13 ASSY: 9641-01 00 SPEAKER ASSY, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	130007		1	LOUDSPEAKER
0002	210105		0	CONTACT, FEMALE, 22-30AWG, CRIMP, TIN-LEAD
0003	210106		1	POLARIZING KEY, CONNECTOR
0004	211313		1	CONNECTOR, 3 PIN, HOUSING, LOCKING, .1 SPACING
0005	605103		0	#24 STRANDED WIRE, BLACK
0006	605105		0	#24 STRANDED WIRE, RED
0007	608003		0	TUBING, HEAT SHRINK, 1/8" DIA, BLACK
0008	608004		0	TUBING, HEAT SHRINK, 3/32" DIA, BLACK

9.14 ASSY: 9655-01 01 ASSEMBLY REAR PANEL, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	9655-10	02	1	REAR PANEL, MODEL 515
0002	9596-01	01	1	MAINS TRANSFORMER ASSEMBLY, MODEL 515
0003	9656-11	00	1	LINE CORD RETAINER MODIFICATION, MODEL 515
0004	9657-01	01	1	WIRE A ASSY, MODEL 515
0005	9689-16	01	1	INSULATOR TRRANSFORMER, MODEL 515
0006	9690-01	00	1	ASSEMBLY WIRE D, MODEL 515
0007	161022		0	LOCTITE '222'
0008	210049		1	PWR ENTRY MODULE, RFI FLTR, PWR SW, 4 V SEL
0009	281500		0	4-40 HEXNUT MACHINE SCREW-STEEL CADMIUM
0010	281501		0	6-32 HEXNUT MACHINE SCREW-STEEL CADMIUM
0011	285009		0	#4 WASHER FLAT STL CAD., .125 ID X .250 OD
0012	285010		0	#6 WASHER FLAT, STL CADM, .125 ID X .250 OD
0013	315028		1	LABEL, "WARNING LIVE PARTS"
0014	608003		0	TUBING, HEAT SHRINK, 1/8" DIA, BLACK
0015	608084		0	TUBING, HEATSHRINK, 4.8MM, BLACK
0016	608103		0	CABLE TIE, SCR MOUNT, 4.3(110)L, .75(19.1)MAX
0017	9655-03	01	0	SCHEMATIC, REAR PANEL
0018	9697-16	00	1	COVER, POWER ENTRY MODULE, MODEL 515
0019	608001		0	CABLE TIE, .094 X 3.62L, SELF-LKG, 1/16 TO 5/8 BDL

9.15 ASSY: 9657-01 01 WIRE A ASSY, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	216003		0	#6 LOCKING TOOTH GROUND LUG SOLDER TYPE
0002	216051		0	TERMINAL, RECEPTACLE, INSUL, .187, 22-18AWG,
0003	605260		0	#18 HOOKUP WIRE, GREEN/YELLOW STRIPE
0004	608007		0	TUBING, HEAT SHRINK, 1/4" DIA, BLACK

9.16 ASSY: 9690-01 00 ASSEMBLY WIRE D, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	216003		0	#6 LOCKING TOOTH GROUND LUG SOLDER TYPE
0002	605260		0	#18 HOOKUP WIRE, GREEN/YELLOW STRIPE
0003	608007		0	TUBING, HEAT SHRINK, 1/4" DIA, BLACK

9.17 ASSY: 9658-01 00 WIRE C ASSY, MODEL 515

LINE	P/N	REV	QPA	DESCRIPTION
0001	216003		0	#6 LOCKING TOOTH GROUND LUG SOLDER TYPE
0002	605260		0	#18 HOOKUP WIRE, GREEN/YELLOW STRIPE
0003	608007		0	TUBING, HEAT SHRINK, 1/4" DIA, BLACK

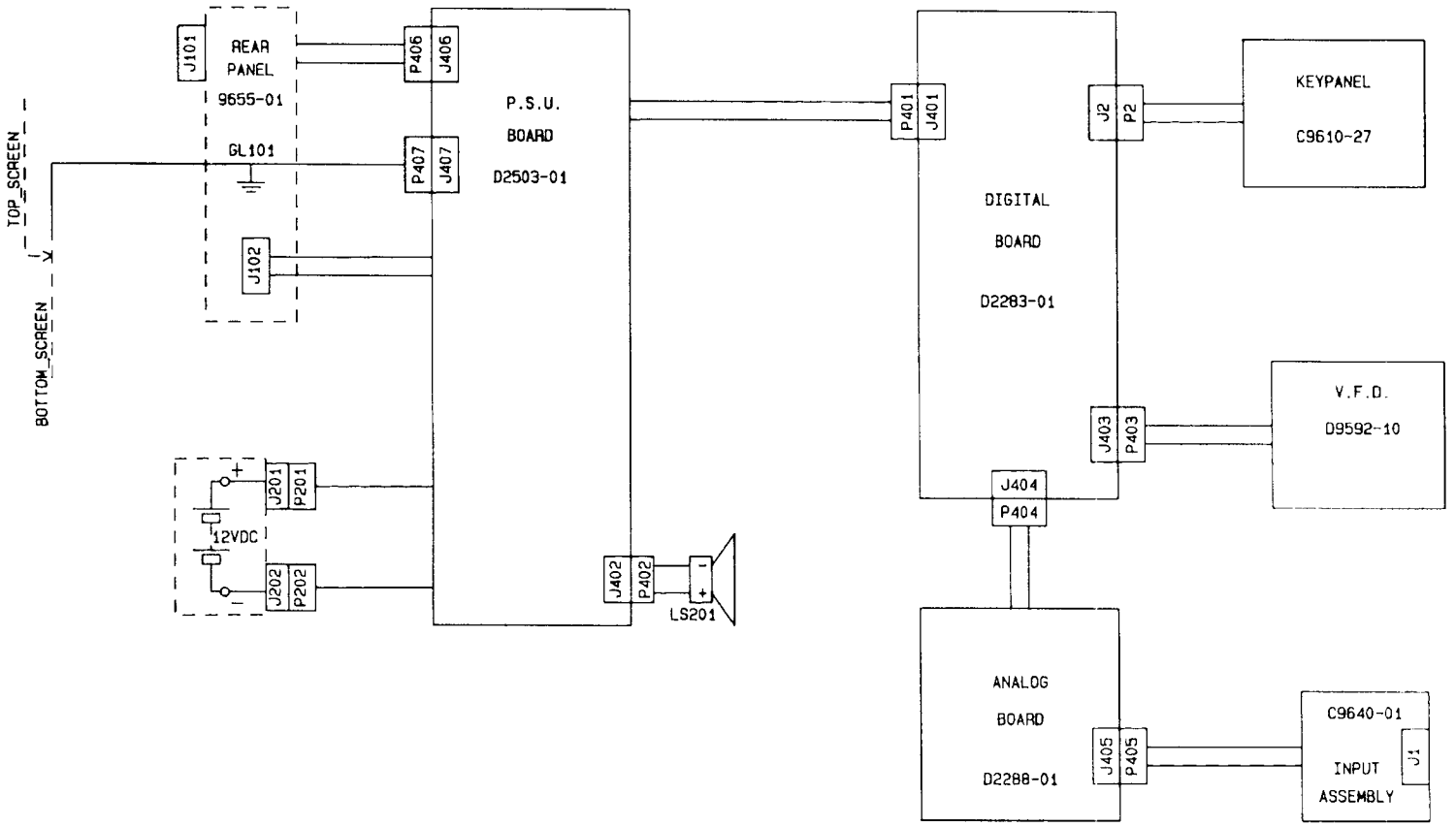
9.18 ASSY: 9616-13 02 TOP HALF SCREENED, MODEL 515

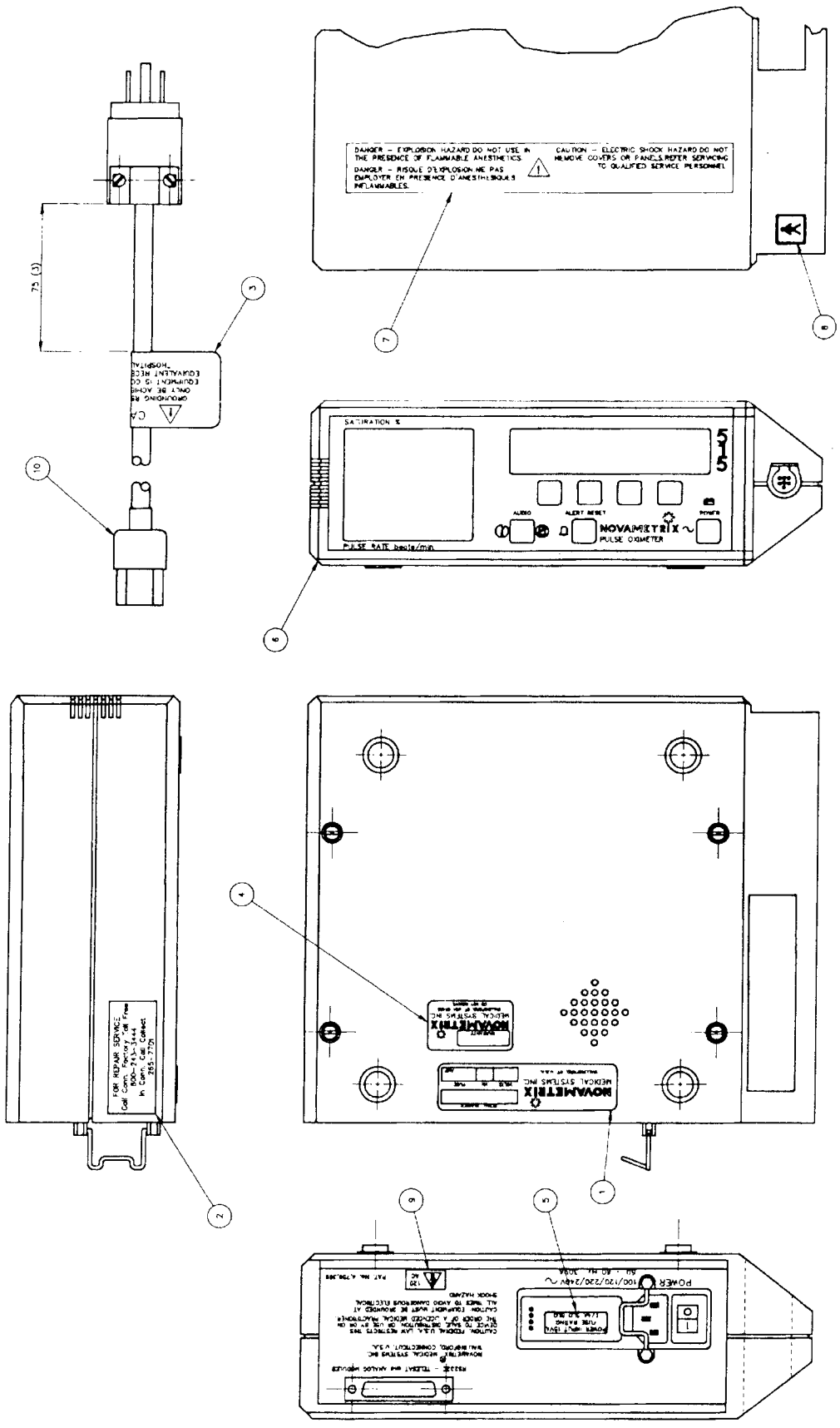
LINE	P/N	REV	QPA	DESCRIPTION
0001	9616-16	00	1	TOP HALVE MOULDING, MODEL 515

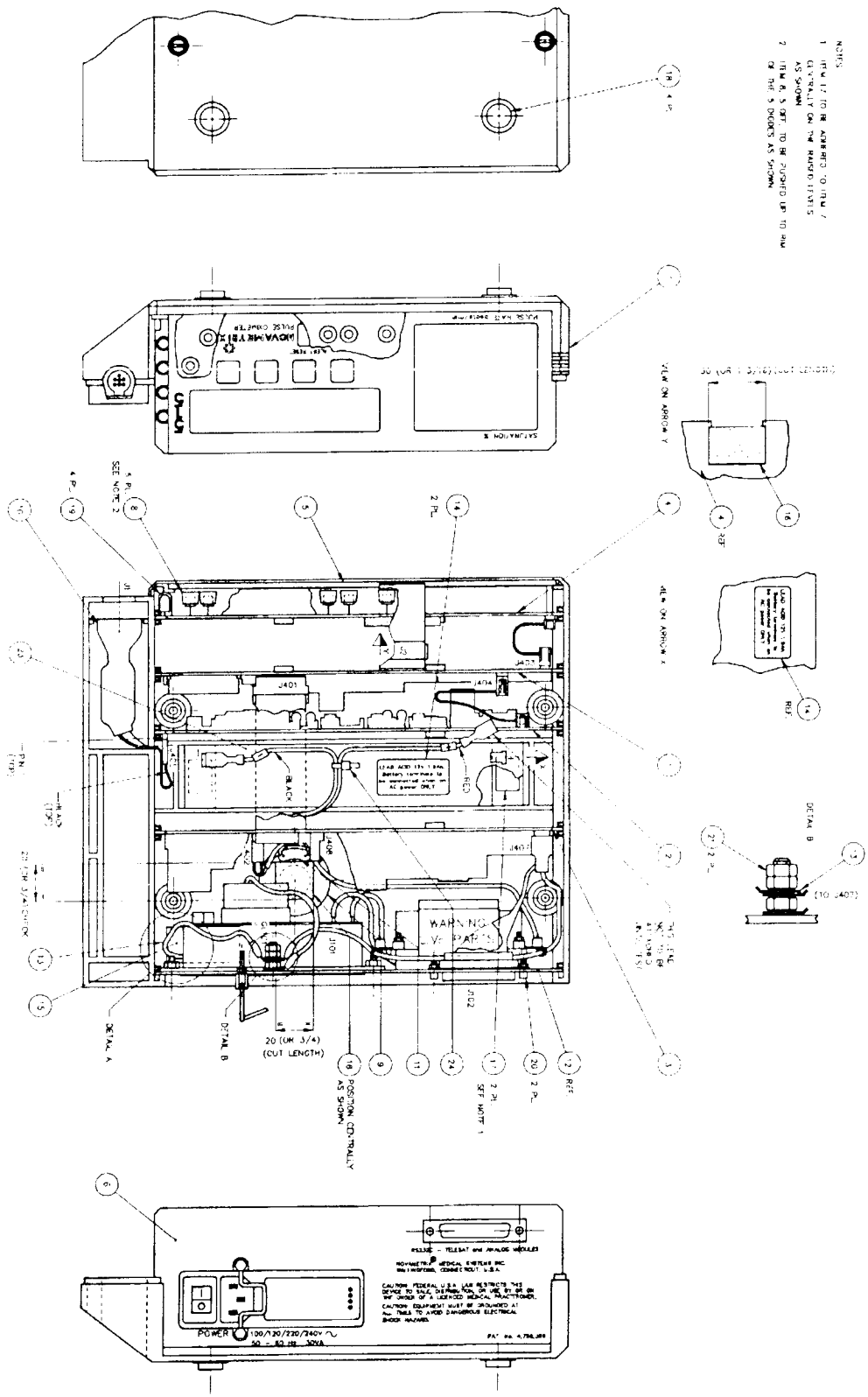
10.0 Schematics and Assembly Drawings

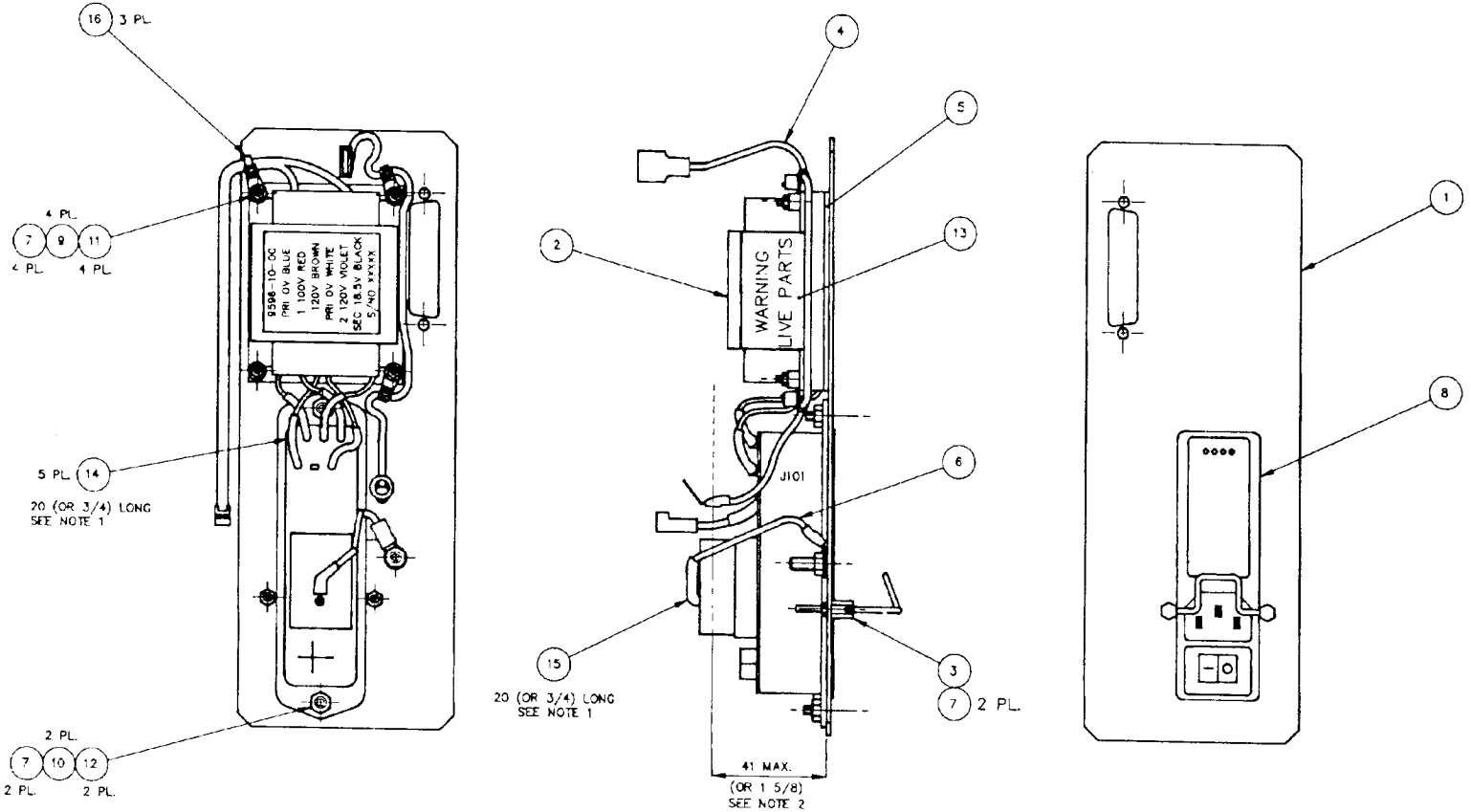
The following is a list of the schematics and assembly drawings fc Model 515 Pulse Oximeter.

1. 9593-09 Overall Wiring
2. 9593-00 Final Assy.
3. 9615-01 Bottom Cover Assy.
4. 9655-01 Rear Panel Assy.
5. 9655-03 Rear Panel Schematic
6. 9610-27 Keypanel Assy.
7. 9640-01 Input Assy.
8. 9596-10 Transformer
9. 2503-01 PSU Assy.
10. 2503-03 PSU Schematic
11. 2288-01 Analog Board Assy.
12. 2288-03 Analog Board Schematic (page 1)
13. 2288-03 Analog Board Schematic (page 2)
14. 2283-01 Digital Board Assy.
15. 2283-03 Digital Board Schematic (page 1)
16. 2283-03 Digital Board Schematic (page 2)
17. 2283-03 Digital Board Schematic (page 3)
18. 2289-01 Analog Module Board Assy.
19. 2289-03 Analog Module Board Schematic
20. 9671-53 Menu Structure (page 1)
21. 9671-53 Menu Structure (page 2)
22. 9671-53 Menu Structure (page 3)


REAR
PANEL
9655-01
J101
GL101
J102
TOP_SCREEN
BOTTOM_SCREEN
P406
J406
P407
J407
P.S.U.
BOARD
D2503-01
J201
P201
12VDC
J202
P202
J402
P402
LS201
P401
J401
DIGITAL
BOARD
D2283-01
J2
P2
KEYPANEL
C9610-27
J403
P403
V.F.D.
D9592-10
J404
P404
ANALOG
BOARD
D2288-01
J405
P405
C9640-01
INPUT
ASSEMBLY
J1

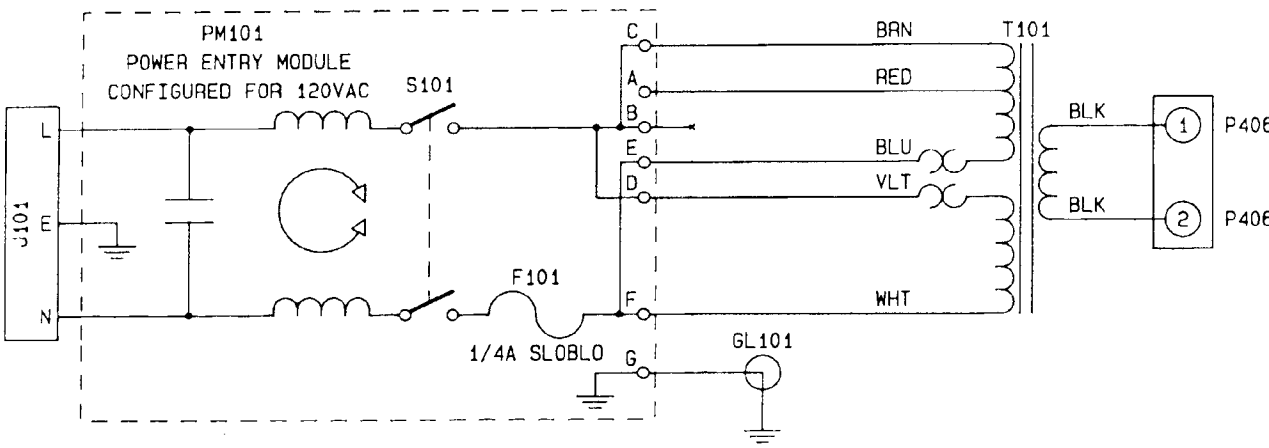

DANGER – EXPLOSION HAZARD DO NOT USE IN THE PRESENCE OF FLAMMABLE ANESTHETICS
DANGER – RISQUE D'EXPLOSION NE PAS EMPLOYER EN PRESENCE D'ANESTHESIQUES INFLAMMABLES.
CAUTION – ELECTRIC SHOCK HAZARD DO NOT REMOVE COVERS OR PANELS REFER SERVICING TO QUALIFIED SERVICE PERSONNEL
75 (3)
SATURATION %
PULSE RATE beats/min
AUDIO
ALERT RESET
POWER
NOVAMETRIX
PULSE OXIMETER
MEDICAL SYSTEMS INC
POWER
100/120/220/240V
FOR REPAIR SERVICE:
Call Comp. Factory, Toll Free
800-243-4444
In Conn. Call Collect
265-7701

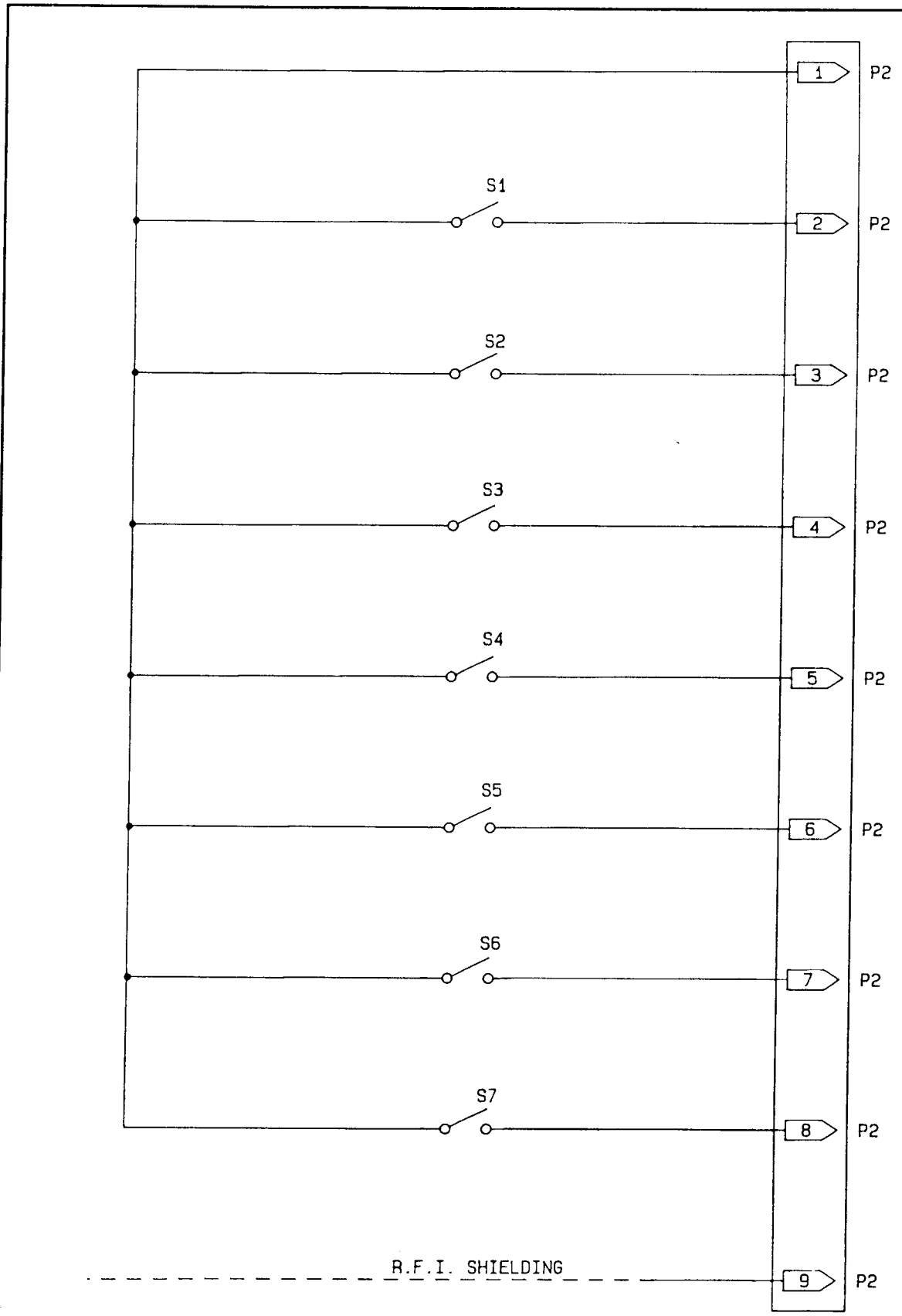

NOTES:
1. ITEM 17 TO BE ADHERED TO ITEM 7 CENTRALLY ON THE MARKED LISTS AS SHOWN.
2. ITEM 18 IS SET TO BE PUSHED UP TO THE 5 DIODES AS SHOWN
SATURATION %
PULSE RATE
DETAIL A
DETAIL B
20 (OR 3/4) (CUT LENGTH)
POSITION CENTRALLY AS SHOWN
SEE NOTE 2
2 PL
REF
BLACK
RED
WARNING
POWER
100/120/220/240V
50 - 60 HZ 30VA

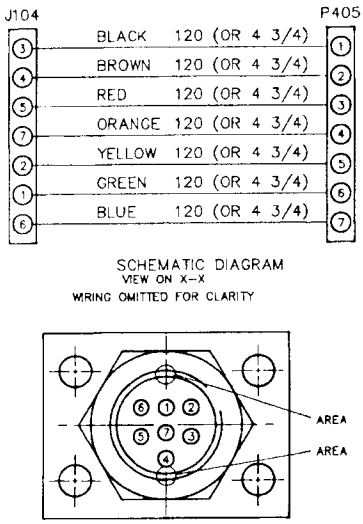


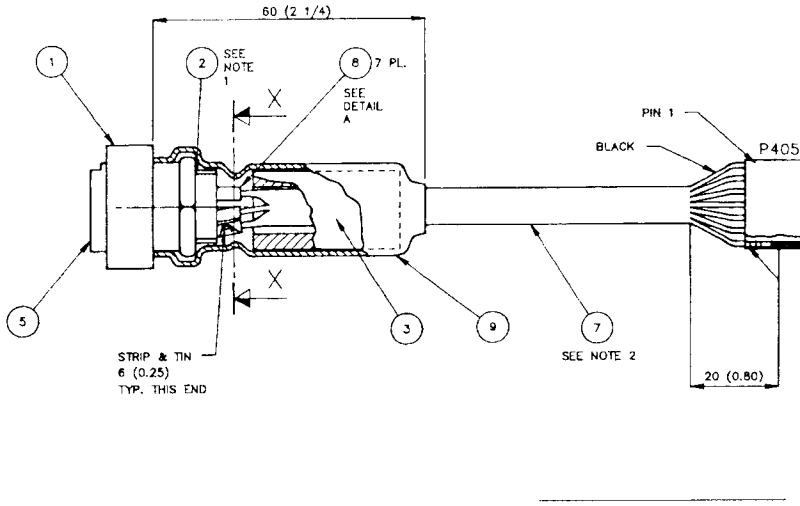
NOTES
1 ITEMS 14 (5 PL.) & 15 TO BE HEAT SHRUNK INTO POSITION OVER JOINTS AFTER SOLDERING
2 PRIMARY WIRES NOT TO EXCEED MAX. DIMENSION SHOWN
3 FOR WIRING INFORMATION SEE DRG. NO. 9655-03

9655-01-01


PM101
POWER ENTRY MODULE
CONFIGURED FOR 120VAC
S101
J101
L
E
N
C
A
B
E
D
F
G
BRN
RED
BLU
VLT
WHT
T101
BLK
BLK
1
2
P406
P406
F101
1/4A SLOBLO
GL101


1
P2
S1
2
P2
S2
3
P2
S3
4
P2
S4
5
P2
S5
6
P2
S6
7
P2
S7
8
P2
R.F.I. SHIELDING
9
P2


J104
P405
3 BLACK 120 (OR 4 3/4) 1
4 BROWN 120 (OR 4 3/4) 2
5 RED 120 (OR 4 3/4) 3
7 ORANGE 120 (OR 4 3/4) 4
2 YELLOW 120 (OR 4 3/4) 5
1 GREEN 120 (OR 4 3/4) 6
6 BLUE 120 (OR 4 3/4) 7
SCHEMATIC DIAGRAM
VIEW ON X-X
WIRING OMITTED FOR CLARITY
6 1 2
5 7 3
4
AREA
AREA


60 (2 1/4)
1
2 SEE NOTE 1
8 7 PL.
SEE DETAIL A
X
X
PIN 1
BLACK
P405
5
3
9
7 SEE NOTE 2
STRIP & TIN 6 (0.25) TYP. THIS END
20 (0.80)

11 Accesories

Model 515B/C PULSE OXIMETER

Catalog No.	Description
6500-00	Model 515B Pulse Oximeter
6550-00	Model 515C Pulse Oximeter with graphic display

SpO2 SENSORS and CABLES

8793	*OxySnap* Y-Sensor (use with *OxySnap* extension cable)
8744	*OxySnap* Finger Sensor (use with *OxySnap* extension cable)
8853	*OxySnap* Extension Cable, 8ft. (use with *OxySnap* sensors)
8898	*OxySnap* Long Extension Cable, 12 ft. (use with *OxySnap* sensors)
8894-00	*OxySnap* Connector Strap (25 per box)
4941	Saturation Sensor Extension Cable, 4 feet (use with non-*OxySnap* sensors)
4942	Saturation Sensor Extension Cable, 6 feet (use with non-*OxySnap* sensors)
4943	Saturation Sensor Extension Cable, 10 feet (use with non-*OxySnap* sensors)
5266	Saturation Sensor Extension Cable, 25 feet (use with non-*OxySnap* sensors)
8776	SuperBright™ Finger Sensor
8791	SuperBright™ Y-Sensor
8789	Special use SuperBright™ Finger Sensor (8 inch sensor cable)
5238	Special Use SuperBright™ Finger Sensor & 25 ft. shielded cable

OxySnap SENSOR MANAGEMENT PLANS

Select an *OxySnap* Finger Sensor or Y-Sensor Management Plan for each SuperBright™ Pulse Oximeter. The plan you select determines the warranty period - 12, 24 or 36 months.
How the plans work: Included in each plan are TWO sensors - one for immediate use, the other one for backup. If a sensor becomes inoperative, place the backup sensor into use and return the inoperative sensor in the convenient prepaid mailer. A replacement sensor will be shipped within two business days of receipt of the inoperative sensor. This simple return/replacement method will be used for the entire warranty period, thereby guaranteeing your costs and virtually eliminating sensor tracking hassles.
Warranty: The plan warranty (not individual sensors) is 12, 24 or 36 months. Replacement sensors provided under terms of the plan shall carry the remaining plan warranty - replacements do not extend the warranty.

8793-12	**Y-12 Plan:** The plan warranty is 12 months. Includes 3 boxes of any Y-Strip Taping Systems

Catalog No.	Description
8793-24	**Y-24 Plan:** The plan warranty is 24 months. Includes 6 boxes of any Y-Strip Taping Systems
8793-36	**Y-36 Plan:** The plan warranty is 36 months. Includes 9 boxes of any Y-Strip Taping Systems
8744-12	**Finger-12 Plan:** The plan warranty is 12 months.
8744-24	**Finger-24 Plan:** The plan warranty is 24 months.
8744-36	**Finger-36 Plan:** The plan warranty is 36 months.
Y-SENSOR APPLICATORS (tapes, wraps, earclip)	
8828	20mm Wrap Style Y-Strip Taping System (100 per box) Use on neonatal foot and hand, or on pediatric toe or finger, color coded blue.
8829	25mm Wrap Style Y-Strip Taping System (100 per box) Use on neonatal foot and hand, color coded green
8831	20mm Finger Style Y-Strip Taping System (100 per box) Use on pediatric finger or on small adult finger, color coded blue
8832	25mm Finger Style Y-Strip Taping System (100 per box) Use on adult finger, color coded green
8836	Non-Adhesive Foam Wraps (25 per box)
6131-50	Ear Clip (Pkg of 5) Includes 10 adhesive dots
6131-25	Ear Clip (Pkg of 25) Includes 50 adhesive dots
8700-00	Adhesive dots (Pkg of 200) For use with ear clip
MOUNTING SYSTEMS	
140030	Wall Mount
140031	Wall Mount (less wall channel)
140032	Pivot Block Mount
140033	Transport Mount (without swivel head)
140034	Transport Mount (with swivel head)
140035	Countertop Mount (11 inch base)
140036	Countertop Mount (5 inch base)
140037	Portable Instrument Housing
140038	Rollstand

Catalog No.	Description
MISCELLANEOUS	
7106-10	Transport Pouch (for monitor)
7104-10	Side Accessory Pouch
6318-00	Kickstand Kit for Model 515B or 515C monitors
600026	Power cord (included with monitor)
REFERENCE CARDS	
6342-32	English
6436-32	Spanish
6435-32	French
6365-32	German
280022	13” chain, used to attach reference card to the monitor
EXTENDED WARRANTY	
	(Normal warranty on monitor - 1 year)
6500-81	Model 515B warranty extended an additional 1 year
6500-82	Model 515B warranty extended an additional 2 years
6550-81	Model 515C warranty extended an additional 1 year
6550-82	Model 515C warranty extended an additional 2 years
BIOMEDICAL SERVICE TRAINING & TEST KITS	
5530-00	TB500B SpO_2 Test Box
9999-96	“focus” Technical Training Seminars, Pulse Oximetry (1 day course)

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12 Parts Lists

Common Replacement Parts List

PART NO	DESCRIPTION
600026	LINE CORD, 7 1/2 FT, Hospital Grade Plug
400024	BATTERY, 12V, 1.9Amp Hour, Lead Acid
6380-27	MEMBRANE KEYPANEL, Model 515C
6375-27	MEMBRANE KEYPANEL, MOdel 515B
6407-01	TOP COVER Assy.
6408-01	BOTTOM COVER Assy
9621-16	LENS, Alert
515023	FUSE, 1/2A SB (for 100-120 VAC)
515033	FUSE, 1/4A SB (for 200-240 VAC)
515084	FUSE 2A, SB, SURFACE MOUNT
515086	FUSE 1A, SURFACE MOUNT

12.1 *Model 515C*

6550-00 Model 515C Pulse Oximeter w/Graphics Display

This list applies to the units with the 6376-01 rear panel assembly (2532 power supply board) and the 2722 main board.

PART NO	REV	QPA	DESCRIPTION
1003-32	03	1	LABEL, SERIAL NUMBER, 3.000 X.5000
1217-32	03	1	REPAIR LABEL
315032		1	LABEL,"120 VAC" 10 X 20 MM BLK LETTERS
4470-32	00	1	LABEL, CAUTION GROUNDING
600026		1	LINE CORD, AC, 7 1/2 FT, HOSP GR PLUG-BUS MAC
6550-01	00	1	MAIN ASSY,
9760-32	01	1	LABEL, FUSE RATING, 1/2A, SLO-BLO,

This list applies to the units with the 6487-01 rear panel assembly (2725 power supply board) and the 2724 main board.

LINE	PART NO	REV	QPA	DESCRIPTION
0001	1003-32	03	1	LABEL, SERIAL NUMBER, 3.000 X.5000
0002	1217-32	03	1	REPAIR LABEL
0003	4470-32	00	1	LABEL, CAUTION GROUNDING
0004	6550-01	03	1	MAIN ASSY, MODEL 515C
0010	4042-32	00	1	U L LABEL
0015	315032		1	LABEL,"120 VAC" 10 X 20 MM BLK LETTERS,YEL BA
0016	600026		1	LINE CORD, AC, 7 1/2 FT, HOSP GR PLUG-BUS MAC

6550-01-00 Main Assy

This list applies to the units with the 6376-01 rear panel assembly (2532 power supply board) and the 2722 main board.

PART NO	REV	QPA	DESCRIPTION
2722-01	00	1	MAIN BOARD ASSY,
286205		0	6-32 X 3/4 S.B.H. CAD PLATED
400024		1	BATTERY, 12V, 1.9 AMP HOUR, LEAD ACID
6376-01	00	1	REAR PANEL ASSY,
6380-27	00	1	MEMBRANE KEYPANEL,
6381-01	00	1	SPO2 INPUT CONNECTOR ASSEMBLY
6382-01	00	1	POWER HARNESS ASSY,
6407-01	00	1	TOP COVER ASSY,
6408-01	00	1	BOTTOM COVER ASSY,
9621-16	02	1	LENS, ALERT
9624-16	00	8	LED REFLECTOR
6429-10	00	1	BATTERY SUPPORT BRACKET

This list applies to the units with the 6487-01 rear panel assembly (2725 power supply board) and the 2724 main board.

LINE	PART NO	REV	QPA	DESCRIPTION
0001	2724-01	01	1	MAIN BOARD ASSY, MODEL 515C
0005	6487-01	00	1	REAR PANEL ASSY, MODEL 515B & 515C
0006	6380-27	04	1	MEMBRANE KEYPANEL, MODEL 515C
0007	6381-01	00	1	CABLE ASSY, SPO2 INPUT, MODEL 515B & 515C
0008	6382-01	00	1	POWER HARNESS ASSY, MODEL 515B & 515C
0009	6407-01	00	1	TOP COVER ASSY, MODEL 515B & 515C
0010	6408-01	01	1	BOTTOM COVER ASSY, MODEL 515B & 515C
0011	6429-10	00	1	BRACKET, BATTERY SUPPORT, MODEL 515B & 515C
0012	9621-16	02	1	LENS, ALERT, MODEL 515
0013	9624-16	00	8	LED REFLECTOR, MODEL 515
0019	161095		0	TAPE, FOAM, 1.5W X.062T X 50FT L, BLK, PR SE
0020	286205		0	6-32 X 3/4 S.B.H. CAD PLATED
0021	400024		1	BATTERY, 12V DC, 2.3 AMP HOUR, LEAD ACID

2722-01 01 Main Board Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	2722-03	01	0	SCHEMATIC, MAIN BOARD, MODEL 515C
0002	2722-04	00	0	TEST PROCEDURE, MAIN BOARD, MODEL 515C
0003	2721-17	01	1	MAIN BOARD SUBASSY, MODEL 515B & 515C
0004	6406-01	00	1	GRAPHICS DISPLAY ASSY, MODEL 515C
0005	6410-07	03	1	PROGRAM, EPROM ASSY, SPO2, 515B & 515C
0015	281204		0	SCREW, 2-56 X 3/16 L, PHILLIPS, STEEL, NICKEL
0016	285012		0	LOCK WASHER, NO. 2, INTERNAL TOOTH, STEEL, CA

2721-17 01 Main Board Subassy

PART NO	QPA	DESCRIPTION
130014	1	SPEAKER, 550 HZ,.5W, 2 IN. DIA, PC MOUNT

PART NO	QPA	DESCRIPTION
152066	1	CAPACITOR, 220UF, 63V, RADIAL, ELECTROLYTIC
152070	1	CAPACITOR, 1000UF, 10V, 20%, ELCTLT, RADIAL,
152086	1	CAPACITOR, 1000UF, 16V, 20%, AL, ELCTLYTC,.2
153058	1	CAPACITOR, 4700PF, 50V, 10%, X7R, CERAMIC, S
154062	3	CAPACITOR,.01UF, 50V, 10%, X7R, SURFACE MOUN
154065	3	CAP,.1UF, 63V,.2 (5MM) SP, POLYESTER FILM
154072	56	CAPACITOR,.1UF, 50V, 10%, X7R, CER CHIP, S M
154074	1	CAPACITOR, 1.5UF, 25VDC, 10%, TANT, SURFACE M
154079	4	CAPACITOR, 10UF, 16V, 10%, TANTALUM, SURFACE
154080	3	CAPACITOR, 47UF, 10VDC, 10%, TANTALUM, SURFAC
154082	2	CAPACITOR, 22PF, 100V, 10%, NPO, MLTILYR CERA
154084	1	CAPACITOR, 2700PF, 100V, 10%, X7R, MLTILYR CE
154085	2	CAPACITOR, 47PF, 100VDC, 5%, MLTILYR CER, SUR
154093	5	CAPACITOR, 68UF, 16VDC, 10%, TANTALUM, SURF M
154094	4	CAPACITOR, 47UF, 20VDC, 20%, TANTALUM, SURF M
180011	1	FERRITE BEAD, 22 AWG TCW WIRE THRU CORE, 1 TU
180019	1	INDUCTOR, 100UH, 10%, SURFACE MOUNT
180021	1	INDUCTOR, 20UH PARALLEL/80UH SERIES, SURFACE
180022	2	INDUCTOR, 10UH, 10%, SURFACE MOUNT
180029	2	INDUCTOR, 50MHZ CUT-OFF FREQUENCY, SURFACE MO
180030	1	INDUCTOR-CAP, 4700PF, 50VDC, 2A, 3 TERM, SURF
211414	1	CONNECTOR, 4 PIN, PLUG, FRICTION LOCK, PC MOU
211634	1	CONNECTOR, 6 PIN, HEADER, DUAL ROW,.100 SP,
211721	1	CONNECTOR, 7 PIN, HEADER,.079 SPACING, PC MO
211914	1	CONNECTOR, 9 PIN, HEADER, SIL,.100 SP, STRAI
212534	1	CONNECTOR, 20 PIN, RECEPTACLE, SIL,.100 SP,
212609	1	CONNECTOR, 24 PIN, HEADER,.100 SPACING, PC M
215059	1	SOCKET, 32 PIN, LOW PROFILE,.6 SPACING
215074	4	SOCKET, 4 PIN, SINGLE-IN-LINE,.100 SP, PC MO
215075	6	SOCKET, 5 PIN, SINGLE-IN-LINE,.100 SP, PC MO
215076	2	SOCKET, 10 PIN, SINGLE-IN-LINE,.100 SP, PC M
215077	2	SOCKET, 15 PIN, SINGLE-IN-LINE,.100 SP, PC M
230023	1	CRYSTAL, 12.288 MHZ, HC49S CASE
280222	8	SPACER, LED, FOR 3 LEADS,.25 DIA X.31 L, BL
470011	1	RESISTOR, 8.2 OHM, 1/4W, 10%, CARBON
472198	1	RESISTOR, 3.3 OHM, 1/4W, 1%, CARBON
472200	1	RESISTOR, 5.6 OHM, 1/4W, 1%
472274	1	RESISTOR, 26.7 OHM, 1/4W, 1%
474136	3	RESISTOR, 1K OHM, 1/8W, 1%, SURFACE MOUNT
474138	13	RESISTOR, 100 OHM, 1/8W, 1%, SURFACE MOUNT
474144	6	RESISTOR, 20.5K OHM, 1/8W, 1%, SURFACE MOUNT
474145	6	RESISTOR, 215 OHM, 1/8W, 1%, SURFACE MOUNT
474148	3	RESISTOR, 2.05K OHM, 1/8W, 1%, SURFACE MOUNT
474149	2	RESISTOR, 33.2K OHM, 1/8W, 1%, SURFACE MOUNT
474153	11	RESISTOR, 42.2K OHM, 1/8W, 1%, SURFACE MOUNT
474157	2	RESISTOR, 511 OHM, 1/8W, 1%, SURFACE MOUNT
474160	1	RESISTOR, 5.11K OHM, 1/8W, 1%, SURFACE MOUNT
474165	11	RESISTOR, 10K OHM, 1/8W, 1%, SURFACE MOUNT
474166	38	RESISTOR, 100K OHM, 1/8W, 1%, SURFACE MOUNT
474172	12	RESISTOR, 10 OHM, 1/8W, 1%, SURFACE MOUNT
474175	3	RESISTOR, 3.92K OHM, 1/8W, 1%, SURFACE MOUNT
474178	1	RESISTOR, 825 OHM, 1/8W, 1%, SURFACE MOUNT

PART NO	QPA	DESCRIPTION
474182	1	RESISTOR, 150K OHM, 1/8W, 1%, SURFACE MOUNT
474185	1	RESISTOR, 150 OHM, 1/8W, 1%, SURFACE MOUNT
474186	4	RESISTOR, 15K OHM, 1/8W, 1%, SURFACE MOUNT
474209	4	RESISTOR, 2.67K OHM, 1/8W, 1%, 1206 STYLE, S
474210	1	RESISTOR, 56.2K OHM, 1/8W, 1%, 1206 STYLE, S
474211	1	RESISTOR, 49.9K OHM, 1/8W, 1%, 1206 STYLE, S
475045	2	E2 POTENTIOMETER, 10K OHM, 20%, SURFACE MOUNT
481546	10	DIODE, MMBD914L, SWITCHING, SURFACE MOUNT
481547	2	DIODE, BAT54, HOT CARRIER SCHOTTKY, SURFACE M
481549	1	DIODE, MBRS140T3, RECTIFIER, SURFACE MOUNT
481552	1	DIODE, MBRS340T3, SCHOTTKY, 40V, 3A, SURFACE
482586	1	LED LIGHT BAR, YELLOW,.36 X.35
482587	1	LED LIGHT BAR, RED,.35 X.35
482588	1	LED BAR GRAPH, 10 ELEMENT, RED, 1 X.400
482589	3	LED 7 SEGMENT DISPLAY, 10MM, BLACK SURFACE, R
482590	3	LED 7 SEGMENT DISPLAY, 14.2MM, BLACK SURFACE,
482591	2	LED, YELLOW,.100 SPACING
482592	1	LED, GREEN,.100 LEAD SPACING
482593	4	LED, RED,.100 SPACING
482594	1	LED, BICOLOR, RED & GREEN, 3 LEAD,.100 SPACI
482596	4	LED, HLMP-C100, RED,.100 SPACING, PC MOUNT
483018	2	TRANSISTOR, MMBT3906T, PNP, SURFACE MOUNT
484060	1	TRANSISTOR, MMBT3904T, NPN, SURFACE MOUNT
484541	1	VOLTAGE REGULATOR, LM317LD, +1.2V - +37V OUT,
484553	1	IC, TL5001CD, PULSE WIDTH MOD CONT, 8 PIN, S
484554	1	VOLTAGE REGULATOR, LT1054CS8, SW CAP, 8 PIN,
484557	1	VOLTAGE REGULATOR, LT1117CST-5, POS, 3 PIN, S
485532	8	TRANSISTOR, 2N7002T1, N-CHAN ENHAN MODE, SURF
485540	1	TRANSISTOR, SI9955DY, MOSFET, DUAL, N-CH ENH,
485546	2	TRANSISTOR, VN0605T, N-CHAN ENHANCEMENT MODE,
485547	2	TRANSISTOR, TPS1101D, P-CH ENHAN MODE MOSFET,
486041	1	IC, MAX7219CWG, DISPLAY DRIVER, 8 DIGIT, 24 P
486306	1	IC, MCM60L256AF10, 32K X 8 CMOS SRAM, 100NS
486319	1	IC, MC14020BD, 14-BIT BINARY COUNTER, SURF MO
486320	1	IC, SN74HC14D, HEX SCHMITT-TRIGGER INV, SURF
486321	1	IC, SN74HC138D, 3-LINE TO 8-LINE DECDR, SURF
486323	3	IC, SN74HC573DW, OCTAL D-TYPE LATCH W 3-ST OU
486324	1	IC, DG444DY, QUAD SPST CMOS ANALOG SW, SURF M
486329	2	IC, SN74HC32D, QUAD 2-IN. POS OR GATE, SURF M
486332	2	IC, AD7703BR, 20-BIT A TO D CONVERTER, SURFAC
486333	1	IC, HD64180RCP-6X, 8-BIT MPU, HI INT, 68 PIN
486334	1	IC, MC14051BD, 8-CH ANALOG MUX/DEMUX, 16 PIN,
486342	1	IC, PCD3311CTDS, MUSICAL-TONE GEN, 16 PIN, S
486790	1	IC, TLE2022CD, DUAL OP AMPLIFIER, H SPEED, LO
486794	1	IC, PM7524FS, 8-BIT D TO A CONV, 16 PIN, SURF
486795	1	IC, TLC549ID, 8-BIT A TO D CONV, SERIAL CONTR
486812	1	IC, AD780AR, 2.5 VOLTAGE REFERENCE, 8 PIN, S
487084	3	IC, OP-282GS, DUAL JFET OP AMP, L PWR, H SPD,
487098	1	IC, MAX705CSA, UPROCESSOR SPRVISORY CKT, S MN
487114	1	IC, MC34119D, AUDIO AMPLIFIER, L PWR, 8 PIN,
515074	1	FUSE, PIGTAIL, 1/16A, 125V, V FAST-ACTING, 1.
515083	1	FUSE W FUSEHOLDER, 1A, 125V, V FAST-ACTING, S

PART NO	QPA	DESCRIPTION
515085	1	FUSE W FUSEHOLDER, 2A, 125V, SLO-BLO, SUBMIN,
2721-02	1	FAB, MAIN BOARD, MODEL 515B AND 515C
5965-07	1	PROGRAM, PEEL ASSY, CSIO CONTROLLER, MODEL 51
5966-07	1	PROGRAM, PEEL ASSY, TIMING SEQUENCER, MODEL 5

2724-01 01 Main Board Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	2723-17	01	1	MAIN BOARD SUBASSY, MODEL 515B & 515C
0002	2724-03	01	0	SCHEMATIC, MAIN BOARD, MODEL 515C
0003	2724-04	00	0	TEST PROCEDURE, MAIN BOARD, MODEL 515C
0004	6410-07	03	1	PROGRAM, EPROM ASSY, SPO2, 515B & 515C
0015	280029		0	SPACER # 2-56 THREADED, 3/16 OD X 3/8 LG
0016	281204		0	SCREW, 2-56 X 3/16 L, PHILLIPS, STEEL, NICKEL
0017	285012		0	LOCK WASHER, NO. 2, INTERNAL TOOTH, STEEL, CA
0018	482597		1	LCD DISPLAY, WITH LED BACKLIGHT AND CONNECTOR

12.2 *Model 515B*

6500-00-00 Model 515B Pulse Oximeter

This list applies to the units with the 6376-01 rear panel assembly (2532 power supply board) and the 2721 main board.

PART NO	REV	QPA	DESCRIPTION
1003-32	03	1	LABEL, SERIAL NUMBER, 3.000 X.5000
1217-32	03	1	REPAIR LABEL
315032		1	LABEL,"120 VAC" 10 X 20 MM BLK LETTERS
4470-32	00	1	LABEL, CAUTION GROUNDING
600026		1	LINE CORD, AC, 7 1/2 FT, HOSP GR PLUG-BUS MAC
6500-01	00	1	MAIN ASSY,
9760-32	01	1	LABEL, FUSE RATING, 1/2A, SLO-BLO,

This list applies to the units with the 6487-01 rear panel assembly (2725 power supply board) and the 2724 main board.

LINE	PART NO	REV	QPA	DESCRIPTION
0001	1003-32	03	1	LABEL, SERIAL NUMBER, 3.000 X.5000
0002	1217-32	03	1	REPAIR LABEL
0003	4470-32	00	1	LABEL, CAUTION GROUNDING
0004	6500-01	03	1	MAIN ASSY, MODEL 515B
0010	4042-32	00	1	U L LABEL
0015	315032		1	LABEL,"120 VAC" 10 X 20 MM BLK LETTERS,YEL BA
0016	600026		1	LINE CORD, AC, 7 1/2 FT, HOSP GR PLUG-BUS MAC

6500-01-00 Main Assy

This list applies to the units with the 6376-01 rear panel assembly (2532 power supply board) and the 2721 main board.

PART NO	REV	QPA	DESCRIPTION
2721-01	00	1	MAIN BOARD ASSY,
286205		0	6-32 X 3/4 S.B.H. CAD PLATED
400024		1	BATTERY, 12V, 1.9 AMP HOUR, LEAD ACID
6375-27	00	1	MEMBRANE KEYPANEL,
6376-01	00	1	REAR PANEL ASSY,
6381-01	00	1	SPO2 INPUT CONNECTOR ASSEMBLY
6382-01	00	1	POWER HARNESS ASSY,
6407-01	00	1	TOP COVER ASSY,
6408-01	00	1	BOTTOM COVER ASSY,
9621-16	02	1	LENS, ALERT
9624-16	00	8	LED REFLECTOR
6429-10	00	1	BATTERY SUPPORT BRACKET

This list applies to the units with the 6487-01 rear panel assembly (2725 power supply board) and the 2723 main board.

LINE	PART NO	REV	QPA	DESCRIPTION
0001	2723-01	01	1	MAIN BOARD ASSY, MODEL 515B
0005	6487-01	00	1	REAR PANEL ASSY, MODEL 515B & 515C
0006	6375-27	04	1	MEMBRANE KEYPANEL, MODEL 515B
0007	6381-01	00	1	CABLE ASSY, SPO2 INPUT, MODEL 515B & 515C
0008	6382-01	00	1	POWER HARNESS ASSY, MODEL 515B & 515C
0009	6407-01	00	1	TOP COVER ASSY, MODEL 515B & 515C
0010	6408-01	01	1	BOTTOM COVER ASSY, MODEL 515B & 515C
0011	6429-10	00	1	BRACKET, BATTERY SUPPORT, MODEL 515B & 515C
0012	9621-16	02	1	LENS, ALERT, MODEL 515
0013	9624-16	00	8	LED REFLECTOR, MODEL 515
0019	161095		0	TAPE, FOAM, 1.5W X.062T X 50FT L, BLK, PR SE
0020	286205		0	6-32 X 3/4 S.B.H. CAD PLATED
0021	400024		1	BATTERY, 12V DC, 2.3 AMP HOUR, LEAD ACID

2721-01 01 Main Board Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	2721-03	01	0	SCHEMATIC, MAIN BOARD, MODEL 515B
0002	2721-04	00	0	TEST PROCEDURE, MAIN BOARD, MODEL 515B
0003	2721-17	01	1	MAIN BOARD SUBASSY, MODEL 515B & 515C
0004	6410-07	03	1	PROGRAM, EPROM ASSY, SPO2, 515B & 515C

2721-17-00 Main Board Subassy

PART NO	REV	QPA	DESCRIPTION
130014		1	SPEAKER, 550 HZ,.5W, 2 IN. DIA, PC MOUNT
152066		1	CAPACITOR, 220UF, 63V, RADIAL, ELECTROLYTIC
152070		1	CAPACITOR, 1000UF, 10V, 20%, ELCTLT, RADIAL,
152086		1	CAPACITOR, 1000UF, 16V, 20%, AL, ELCTLYTC,.2

PART NO	REV	QPA	DESCRIPTION
153058		1	CAPACITOR, 4700PF, 50V, 10%, X7R, CERAMIC, S
154062		3	CAPACITOR,.01UF, 50V, 10%, X7R, SURFACE MOUN
154065		3	CAP,.1UF, 63V,.2 (5MM) SP, POLYESTER FILM
154072		56	CAPACITOR,.1UF, 50V, 10%, X7R, CER CHIP, S M
154074		1	CAPACITOR, 1.5UF, 25VDC, 10%, TANT, SURFACE M
154079		4	CAPACITOR, 10UF, 16V, 10%, TANTALUM, SURFACE
154080		3	CAPACITOR, 47UF, 10VDC, 10%, TANTALUM, SURFAC
154082		2	CAPACITOR, 22PF, 100V, 10%, NPO, MLTILYR CERA
154084		1	CAPACITOR, 2700PF, 100V, 10%, X7R, MLTILYR CE
154085		2	CAPACITOR, 47PF, 100VDC, 5%, MLTILYR CER, SUR
154093		5	CAPACITOR, 68UF, 16VDC, 10%, TANTALUM, SURF M
154094		4	CAPACITOR, 47UF, 20VDC, 20%, TANTALUM, SURF M
180011		1	FERRITE BEAD, 22 AWG TCW WIRE THRU CORE, 1 TU
180019		1	INDUCTOR, 100UH, 10%, SURFACE MOUNT
180021		1	INDUCTOR, 20UH PARALLEL/80UH SERIES, SURFACE
180022		2	INDUCTOR, 10UH, 10%, SURFACE MOUNT
180029		2	INDUCTOR, 50MHZ CUT-OFF FREQUENCY, SURFACE MO
180030		1	INDUCTOR-CAP, 4700PF, 50VDC, 2A, 3 TERM, SURF
211414		1	CONNECTOR, 4 PIN, PLUG, FRICTION LOCK, PC MOU
211634		1	CONNECTOR, 6 PIN, HEADER, DUAL ROW,.100 SP,
211721		1	CONNECTOR, 7 PIN, HEADER,.079 SPACING, PC MO
211914		1	CONNECTOR, 9 PIN, HEADER, SIL,.100 SP, STRAI
212609		1	CONNECTOR, 24 PIN, HEADER,.100 SPACING, PC M
215059		1	SOCKET, 32 PIN, LOW PROFILE,.6 SPACING
215074		4	SOCKET, 4 PIN, SINGLE-IN-LINE,.100 SP, PC MO
215075		6	SOCKET, 5 PIN, SINGLE-IN-LINE,.100 SP, PC MO
215076		2	SOCKET, 10 PIN, SINGLE-IN-LINE,.100 SP, PC M
215077		2	SOCKET, 15 PIN, SINGLE-IN-LINE,.100 SP, PC M
230023		1	CRYSTAL, 12.288 MHZ, HC49S CASE
280222		8	SPACER, LED, FOR 3 LEADS,.25 DIA X.31 L, BL
472198		1	RESISTOR, 3.3 OHM, 1/4W, 1%, CARBON
472200		1	RESISTOR, 5.6 OHM, 1/4W, 1%
472274		1	RESISTOR, 26.7 OHM, 1/4W, 1%
474136		3	RESISTOR, 1K OHM, 1/8W, 1%, SURFACE MOUNT
474138		13	RESISTOR, 100 OHM, 1/8W, 1%, SURFACE MOUNT
474144		6	RESISTOR, 20.5K OHM, 1/8W, 1%, SURFACE MOUNT
474145		6	RESISTOR, 215 OHM, 1/8W, 1%, SURFACE MOUNT
474148		2	RESISTOR, 2.05K OHM, 1/8W, 1%, SURFACE MOUNT
474149		2	RESISTOR, 33.2K OHM, 1/8W, 1%, SURFACE MOUNT
474153		11	RESISTOR, 42.2K OHM, 1/8W, 1%, SURFACE MOUNT
474157		2	RESISTOR, 511 OHM, 1/8W, 1%, SURFACE MOUNT
474160		1	RESISTOR, 5.11K OHM, 1/8W, 1%, SURFACE MOUNT
474165		10	RESISTOR, 10K OHM, 1/8W, 1%, SURFACE MOUNT
474166		38	RESISTOR, 100K OHM, 1/8W, 1%, SURFACE MOUNT
474172		12	RESISTOR, 10 OHM, 1/8W, 1%, SURFACE MOUNT
474175		3	RESISTOR, 3.92K OHM, 1/8W, 1%, SURFACE MOUNT
474178		1	RESISTOR, 825 OHM, 1/8W, 1%, SURFACE MOUNT
474182		1	RESISTOR, 150K OHM, 1/8W, 1%, SURFACE MOUNT
474185		1	RESISTOR, 150 OHM, 1/8W, 1%, SURFACE MOUNT
474186		4	RESISTOR, 15K OHM, 1/8W, 1%, SURFACE MOUNT
474209		4	RESISTOR, 2.67K OHM, 1/8W, 1%, 1206 STYLE, S
474210		1	RESISTOR, 56.2K OHM, 1/8W, 1%, 1206 STYLE, S

PART NO	REV	QPA	DESCRIPTION
474211		1	RESISTOR, 49.9K OHM, 1/8W, 1%, 1206 STYLE, S
475045		1	E2 POTENTIOMETER, 10K OHM, 20%, SURFACE MOUNT
481546		10	DIODE, MMBD914L, SWITCHING, SURFACE MOUNT
481547		2	DIODE, MMBD301L, HOT CARRIER SCHOTTKY, SURF M
481549		1	DIODE, MBRS140T3, RECTIFIER, SURFACE MOUNT
481552		1	DIODE, MBRS340T3, SCHOTTKY, 40V, 3A, SURFACE
482565		4	LED, CLEAR, ROUND
482586		1	LED LIGHT BAR, YELLOW,.36 X.35
482587		1	LED LIGHT BAR, RED,.35 X.35
482588		1	LED BAR GRAPH, 10 ELEMENT, RED, 1 X.400
482589		3	LED 7 SEGMENT DISPLAY, 10MM, BLACK SURFACE, R
482590		3	LED 7 SEGMENT DISPLAY, 14.2MM, BLACK SURFACE,
482591		2	LED, YELLOW,.100 SPACING
482592		1	LED, GREEN,.100 LEAD SPACING
482593		4	LED, RED,.100 SPACING
482594		1	LED, BICOLOR, RED & GREEN, 3 LEAD,.100 SPACI
483018		1	TRANSISTOR, MMBT3906T, PNP, SURFACE MOUNT
484060		1	TRANSISTOR, MMBT3904T, NPN, SURFACE MOUNT
484541		1	VOLTAGE REGULATOR, LM317LD, +1.2V - +37V OUT,
484553		1	IC, TL5001CD, PULSE WIDTH MOD CONT, 8 PIN, S
484554		1	VOLTAGE REGULATOR, LT1054CS8, SW CAP, 8 PIN,
484557		1	VOLTAGE REGULATOR, LT1117CST-5, POS, 3 PIN, S
485532		8	TRANSISTOR, 2N7002T1, N-CHAN ENHAN MODE, SURF
485540		1	TRANSISTOR, SI9955DY, MOSFET, DUAL, N-CH ENH,
485546		2	TRANSISTOR, VN0605T, N-CHAN ENHANCEMENT MODE,
485547		2	TRANSISTOR, TPS1101D, P-CH ENHAN MODE MOSFET,
486041		1	IC, MAX7219CWG, DISPLAY DRIVER, 8 DIGIT, 24 P
486306		1	IC, MCM60L256AF10, 32K X 8 CMOS SRAM, 100NS
486319		1	IC, MC14020BD, 14-BIT BINARY COUNTER, SURF MO
486320		1	IC, SN74HC14D, HEX SCHMITT-TRIGGER INV, SURF
486321		1	IC, SN74HC138D, 3-LINE TO 8-LINE DECDR, SURF
486323		3	IC, SN74HC573DW, OCTAL D-TYPE LATCH W 3-ST OU
486324		1	IC, DG444DY, QUAD SPST CMOS ANALOG SW, SURF M
486329		2	IC, SN74HC32D, QUAD 2-IN. POS OR GATE, SURF M
486332		2	IC, AD7703BR, 20-BIT A TO D CONVERTER, SURFAC
486333		1	IC, HD64180RCP-6X, 8-BIT MPU, HI INT, 68 PIN
486334		1	IC, MC14051BD, 8-CH ANALOG MUX/DEMUX, 16 PIN,
486342		1	IC, PCD3311CTDS, MUSICAL-TONE GEN, 16 PIN, S
486790		1	IC, TLE2022CD, DUAL HIGH SPEED LO PWR OP AMPL
486794		1	IC, PM7524FS, 8-BIT D TO A CONV, 16 PIN, SURF
486795		1	IC, TLC549ID, 8-BIT A TO D CONV, SERIAL CONTR
486812		1	IC, AD780AR, 2.5 VOLTAGE REFERENCE, 8 PIN, S
487084		3	IC, OP-282GS, DUAL JFET OP AMP, L PWR, H SPD,
487098		1	IC, MAX705CSA, UPROCESSOR SPRVISORY CKT, S MN
487114		1	IC, MC34119D, AUDIO AMPLIFIER, L PWR, 8 PIN,
515074		1	FUSE, 1/16A, 125V, VERY FAST-ACTING, SUBMIN,
515083		1	FUSE WITH FUSEHOLDER, 1A, 125V, SURFACE MOUNT
515085		1	FUSE WITH FUSEHOLDER, 2A, 125V, SLO-BLO, SURF
2721-02	00	1	FAB, MAIN BOARD,
5965-07	01	1	PROGRAM, PEEL ASSY, CSIO CONTROLLER, 51
5966-07	01	1	PROGRAM, PEEL ASSY, TIMING SEQUENCER, 5

2723-01 01 Main Board Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	2723-03	01	0	SCHEMATIC, MAIN BOARD, MODEL 515B
0002	2723-04	00	0	TEST PROCEDURE, MAIN BOARD, MODEL 515B
0003	2723-17	01	1	MAIN BOARD SUBASSY, MODEL 515B & 515C
0004	6410-07	03	1	PROGRAM, EPROM ASSY, SPO2, 515B & 515C

2723-17 01 Main Board Subassy

PART NO	QPA	DESCRIPTION
130014	1	SPEAKER, 550 HZ,.5W, 2 IN. DIA, PC MOUNT
152066	1	CAPACITOR, 220UF, 63V, RADIAL, ELECTROLYTIC
152070	1	CAPACITOR, 1000UF, 10V, 20%, ELCTLT, RADIAL,
152084	1	CAPACITOR, 470UF, 25V, 20%, AL, ELCTLYTC,.2
152086	1	CAPACITOR, 1000UF, 16V, 20%, AL, ELCTLYTC,.2
153058	1	CAPACITOR, 4700PF, 50V, 10%, X7R, CERAMIC, S
154062	4	CAPACITOR,.01UF, 50V, 10%, X7R, SURFACE MOUN
154065	3	CAP,.1UF, 63V,.2 (5MM) SP, POLYESTER FILM
154072	59	CAPACITOR,.1UF, 50V, 10%, X7R, CER CHIP, S M
154074	2	CAPACITOR, 1.5UF, 25VDC, 10%, TANT, SURFACE M
154079	4	CAPACITOR, 10UF, 16V, 10%, TANTALUM, SURFACE
154080	3	CAPACITOR, 47UF, 10VDC, 10%, TANTALUM, SURFAC
154082	2	CAPACITOR, 22PF, 100V, 10%, NPO, MLTILYR CERA
154084	2	CAPACITOR, 2700PF, 100V, 10%, X7R, MLTILYR CE
154085	2	CAPACITOR, 47PF, 100VDC, 5%, MLTILYR CER, SUR
154093	5	CAPACITOR, 68UF, 16VDC, 10%, TANTALUM, SURF M
154095	4	CAPACITOR, 22UF, 20VDC, 10%, TANTALUM, SURF M
180011	1	FERRITE BEAD, 22 AWG TCW WIRE THRU CORE, 1 TU
180019	1	INDUCTOR, 100UH, 10%, SURFACE MOUNT
180021	1	INDUCTOR, 20UH PARALLEL/80UH SERIES, SURFACE
180022	2	INDUCTOR, 10UH, 10%, SURFACE MOUNT
180029	2	INDUCTOR, 50MHZ CUT-OFF FREQUENCY, SURFACE MO
180030	1	INDUCTOR-CAP, 4700PF, 50VDC, 2A, 3 TERM, SURF
211414	1	CONNECTOR, 4 PIN, PLUG, FRICTION LOCK, PC MOU
211634	1	CONNECTOR, 6 PIN, HEADER, DUAL ROW,.100 SP,
211721	1	CONNECTOR, 7 PIN, HEADER,.079 SPACING, PC MO
211914	1	CONNECTOR, 9 PIN, HEADER, SIL,.100 SP, STRAI
212534	1	CONNECTOR, 20 PIN, RECEPTACLE, SIL,.100 SP,
212609	1	CONNECTOR, 24 PIN, HEADER,.100 SPACING, PC M
215059	1	SOCKET, 32 PIN, LOW PROFILE,.6 SPACING
215074	4	SOCKET, 4 PIN, SINGLE-IN-LINE,.100 SP, PC MO
215075	6	SOCKET, 5 PIN, SINGLE-IN-LINE,.100 SP, PC MO
215076	2	SOCKET, 10 PIN, SINGLE-IN-LINE,.100 SP, PC M
215077	2	SOCKET, 15 PIN, SINGLE-IN-LINE,.100 SP, PC M
230023	1	CRYSTAL, 12.288 MHZ, HC49S CASE
2723-02	00 1	FAB, MAIN BOARD, MODEL 515B & 515C
280222	8	SPACER, LED, FOR 3 LEADS,.25 DIA X.31 L, BL
472198	1	RESISTOR, 3.3 OHM, 1/4W, 1%, CARBON
472200	1	RESISTOR, 5.6 OHM, 1/4W, 1%
472274	1	RESISTOR, 26.7 OHM, 1/4W, 1%
474136	4	RESISTOR, 1K OHM, 1/8W, 1%, SURFACE MOUNT

PART NO	QPA	DESCRIPTION
474138	14	RESISTOR, 100 OHM, 1/8W, 1%, SURFACE MOUNT
474144	5	RESISTOR, 20.5K OHM, 1/8W, 1%, SURFACE MOUNT
474145	6	RESISTOR, 215 OHM, 1/8W, 1%, SURFACE MOUNT
474147	1	RESISTOR, 24.9K OHM, 1/8W, 1%, SURFACE MOUNT
474148	2	RESISTOR, 2.05K OHM, 1/8W, 1%, SURFACE MOUNT
474149	3	RESISTOR, 33.2K OHM, 1/8W, 1%, SURFACE MOUNT
474153	14	RESISTOR, 42.2K OHM, 1/8W, 1%, SURFACE MOUNT
474157	1	RESISTOR, 511 OHM, 1/8W, 1%, SURFACE MOUNT
474160	1	RESISTOR, 5.11K OHM, 1/8W, 1%, SURFACE MOUNT
474165	10	RESISTOR, 10K OHM, 1/8W, 1%, SURFACE MOUNT
474166	35	RESISTOR, 100K OHM, 1/8W, 1%, SURFACE MOUNT
474170	1	RESISTOR, 301K OHM, 1/8W, 1%, SURFACE MOUNT
474172	12	RESISTOR, 10 OHM, 1/8W, 1%, SURFACE MOUNT
474175	3	RESISTOR, 3.92K OHM, 1/8W, 1%, SURFACE MOUNT
474178	1	RESISTOR, 825 OHM, 1/8W, 1%, SURFACE MOUNT
474182	2	RESISTOR, 150K OHM, 1/8W, 1%, SURFACE MOUNT
474185	1	RESISTOR, 150 OHM, 1/8W, 1%, SURFACE MOUNT
474186	6	RESISTOR, 15K OHM, 1/8W, 1%, SURFACE MOUNT
474209	4	RESISTOR, 2.67K OHM, 1/8W, 1%, 1206 STYLE, S
474210	1	RESISTOR, 56.2K OHM, 1/8W, 1%, 1206 STYLE, S
474211	2	RESISTOR, 49.9K OHM, 1/8W, 1%, 1206 STYLE, S
475045	2	E2 POTENTIOMETER, 10K OHM, 20%, SURFACE MOUNT
481546	13	DIODE, MMBD914L, SWITCHING, SURFACE MOUNT
481547	2	DIODE, BAT54, HOT CARRIER SCHOTTKY, SURFACE M
481549	1	DIODE, MBRS140T3, RECTIFIER, SURFACE MOUNT
481552	1	DIODE, MBRS340T3, SCHOTTKY, 40V, 3A, SURFACE
482586	1	LED LIGHT BAR, YELLOW,.36 X.35
482587	1	LED LIGHT BAR, RED,.35 X.35
482588	1	LED BAR GRAPH, 10 ELEMENT, RED, 1 X.400
482589	3	LED 7 SEGMENT DISPLAY, 10MM, BLACK SURFACE, R
482590	3	LED 7 SEGMENT DISPLAY, 14.2MM, BLACK SURFACE,
482591	2	LED, YELLOW,.100 SPACING
482592	1	LED, GREEN,.100 LEAD SPACING
482593	4	LED, RED,.100 SPACING
482594	1	LED, BICOLOR, RED & GREEN, 3 LEAD,.100 SPACI
482596	4	LED, HLMP-C100, RED,.100 SPACING, PC MOUNT
483018	1	TRANSISTOR, MMBT3906T, PNP, SURFACE MOUNT
484060	1	TRANSISTOR, MMBT3904T, NPN, SURFACE MOUNT
484541	1	VOLTAGE REGULATOR, LM317LD, +1.2V - +37V OUT,
484553	1	IC, TL5001CD, PULSE WIDTH MOD CONT, 8 PIN, S
484554	1	VOLTAGE REGULATOR, LT1054CS8, SW CAP, 8 PIN,
484557	1	VOLTAGE REGULATOR, LT1117CST-5, POS, 3 PIN, S
485532	9	TRANSISTOR, 2N7002T1, N-CHAN ENHAN MODE, SURF
485540	1	TRANSISTOR, SI9955DY, MOSFET, DUAL, N-CH ENH,
485546	2	TRANSISTOR, VN0605T, N-CHAN ENHANCEMENT MODE,
485547	2	TRANSISTOR, TPS1101D, P-CH ENHAN MODE MOSFET,
486041	1	IC, MAX7219CWG, DISPLAY DRIVER, 8 DIGIT, 24 P
486306	1	IC, MCM60L256AF10, 32K X 8 CMOS SRAM, 100NS
486319	1	IC, MC14020BD, 14-BIT BINARY COUNTER, SURF MO
486320	1	IC, SN74HC14D, HEX SCHMITT-TRIGGER INV, SURF
486321	1	IC, SN74HC138D, 3-LINE TO 8-LINE DECDR, SURF
486323	3	IC, SN74HC573DW, OCTAL D-TYPE LATCH W 3-ST OU

PART NO	QPA	DESCRIPTION
486324	1	IC, DG444DY, QUAD SPST CMOS ANALOG SW, SURF M
486329	2	IC, SN74HC32D, QUAD 2-IN. POS OR GATE, SURF M
486332	2	IC, AD7703BR, 20-BIT A TO D CONVERTER, SURFAC
486333	1	IC, HD64180RCP-6X, 8-BIT MPU, HI INT, 68 PIN
486334	1	IC, MC14051BD, 8-CH ANALOG MUX/DEMUX, 16 PIN,
486342	1	IC, PCD3311CTDS, MUSICAL-TONE GEN, 16 PIN, S
486790	1	IC, TLE2022CD, DUAL OP AMPLIFIER, H SPEED, LO
486794	1	IC, PM7524FS, 8-BIT D TO A CONV, 16 PIN, SURF
486795	1	IC, TLC549ID, 8-BIT A TO D CONV, SERIAL CONTR
486812	1	IC, AD780AR, 2.5 VOLTAGE REFERENCE, 8 PIN, S
486814	1	IC, AD820AR, FET INPUT OP AMP, SURF MNT, 8 PI
487084	3	IC, OP-282GS, DUAL JFET OP AMP, L PWR, H SPD,
487098	1	IC, MAX705CSA, UPROCESSOR SPRVISORY CKT, S MN
487114	1	IC, MC34119D, AUDIO AMPLIFIER, L PWR, 8 PIN,
515074	1	FUSE, PIGTAIL, 1/16A, 125V, V FAST-ACTING, 1.
515083	1	FUSE W FUSEHOLDER, 1A, 125V, V FAST-ACTING, S
515085	1	FUSE W FUSEHOLDER, 2A, 125V, SLO-BLO, SUBMIN,
5965-07	1	PROGRAM, PEEL ASSY, CSIO CONTROLLER, MODEL 51
5966-07	1	PROGRAM, PEEL ASSY, TIMING SEQUENCER, MODEL 5

12.3 *Common Assemblies to both Models 515B & 515C*

6376-01-00 Rear Panel Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	2532-01	00	1	POWER SUPPLY BOARD ASSY,
0002	5743-10	01	1	POWER ENTRY MODULE,
0003	5812-10	00	2	SPACER, SUPPORT
0004	5819-01	02	1	GROUND WIRE ASSY, 3 1/2 IN. L
0005	6376-10	00	1	PANEL, REAR,
0006	6376-32	01	1	FACEPLATE, REAR PANEL,
0011	161008		0	ADHESIVE, 242, THREADLOCKER, MED STR, BLUE, 1
0012	216059		1	CONNECTOR, PLUG, POTENTIAL COMPENSATION
0013	280188		0	STANDOFF, 3/8 DIA X 3/8 L, 6-32 THD THRU, ALU
0014	281500		0	NUT, HEX, NO. 4-40, STEEL, CADMIUM PLATE
0015	281501		0	NUT, HEX, NO. 6-32, STEEL, CADMIUM PLATE
0016	285000		0	LOCK WASHER, NO. 4, INTERNAL TOOTH, STEEL, CA
0017	285001		0	LOCK WASHER, NO. 6, INTERNAL TOOTH, STEEL, CA
0018	285046		0	WASHER, FLAT, NO. 6 SAE, 3/8 OD X 5/32 ID X 5
0019	286219		0	SCREW, 6-32 X 1 1/4 (31.8) L, PAN HD, PHILLIP
0020	515023		2	1/2A 250V SLO-BLO (IEC127-111 5X20)

6381-01-00 SpO2 Input Connector Assembly

LINE	PART NO	REV	QPA	DESCRIPTION
0001	5606-16	00	1	DRESS BEZEL, SAO2 INPUT
0002	5642-10	00	0	WIRE, 28AWG, ORANGE, CS95 ALLOY, FEP INSULATI
0003	8884-10	02	1	CABLE, 30AWG, 3 SINGLE & 1 TW SHLD PR, POLYUR
0006	161007		0	ADHESIVE, 414, HIGH STRENGTH, COLOR: CLEAR
0007	211704		1	CONNECTOR, RCPT, 7 PIN, PNL MOUNT, WITH HARDW
0008	211719		1	CONNECTOR, 7 PIN, RECEPTACLE, 28AWG THRU 26AW

LINE	PART NO	REV	QPA	DESCRIPTION
0009	280108		2	SNAP RIVET
0010	608003		0	TUBING, HEAT SHRINK, 1/8 (3.2) DIA, BLACK
0011	608005		0	TUBING, HEAT SHRINK, 1/16 (1.6) DIA, BLACK

6382-01-00 Power Harness Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	211215		1	CONNECTOR, 2 PIN HOUSING, CLOSED END
0002	211413		0	CONNECTOR, 4 PIN, RECEPTACLE, 22AWG
0003	216051		2	TERMINAL, RECEPTACLE, INSUL,.187, 22-18AWG,
0004	605154		0	#22 7/30 TC HOOKUP WIRE, 300V, RED
0005	605156		0	#22 7/30 TC HOOKUP WIRE, 300V, BLACK
0006	608001		0	CABLE TIE,.094 X 3.62L, SELF-LKG, 1/16 TO 5/

6407-01-00 Top Cover Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	5765-16	00	1	TOP COVER, WHITE
0002	6427-32	00	1	LABEL, WARNING, EXPLOSION HAZARD,
0003	5828-32	00	1	LABEL, ISOLATION -
0004	5854-10	00	1	BATTERY SUPPORT,
0005	6409-32	00	1	LABEL, INSTRUCTIONS, TOP COVER,

6408-01 01 Bottom Cover Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	5405-10	00	1	SHIELD, BATTERY, MODEL 515
0002	5409-32	00	1	LABEL, WARNING, POLE MOUNT, MODEL 515
0003	5766-16	01	1	BOTTOM COVER, WHITE, 520A, 1265 & 7100
0004	6473-10	00	1	FOAM TAPE, 1 IN. X 1 IN., MODEL 515B & 515C
0009	161064		0	TAPE, 3/4 X 60 YDS, CLEAR, DOUBLE-SIDED ADHES
0010	240056		4	FOOT, RUBBER,.81 SQ X.3 HI W TAPER, WHITE,

2532-01-00 Power Supply Board Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	2472-02	02	1	FAB, POWER SUPPLY BOARD,
0002	2532-03	00	0	SCHEMATIC, POWER SUPPLY BOARD,
0003	2532-04	XX	0	TEST PROCEDURE, POWER SUPPLY BOARD
0004	5918-10	02	1	XFMR, MAINS, PWR SPLY BD
0011	152029		1	CAPACITOR, 220UF 20%, 35V, ALUM, ELECTROLYTIC
0012	152081		1	CAPACITOR, 6800UF, 35V, 20%, AL, ELECTROLYTIC
0013	154016		5	CAPACITOR,.1UF, 50V,.100 SPACING, DIPPED RA
0014	180014		1	INDUCTOR, 25UH,.25 SPACING, PC MOUNT
0015	211213		1	CONNECTOR, 2 PIN, POST HEADER
0016	211505		1	CONNECTOR, 5 PIN, SQ POST HEADER,.156 SP, FR
0017	470026		1	RESISTOR, 150 OHM, 1/4W, 10%, CARBON
0018	472005		1	RESISTOR, 249 OHM, 1/4W, 1%, CARBON
0019	472016		1	RESISTOR, 2.21K OHM, 1/4W, 1%, CARBON
0020	472022		1	RESISTOR, 4.99K OHM, 1/4W, 1%, CARBON

LINE	PART NO	REV	QPA	DESCRIPTION
0021	472030		1	RESISTOR, 10K OHM, 1/4W, 1%, CARBON
0022	472049		1	RESISTOR, 49.9K OHM, 1/4W, 1%, CARBON
0023	472058		3	RESISTOR, 100K OHM, 1/4W, 1%, CARBON
0024	472065		1	RESISTOR, 200K OHM, 1/4W, 1%, CARBON
0025	472044		1	RESISTOR, 26.1K OHM, 1/4W, 1%, CARBON
0026	472146		1	RESISTOR, 47.5K OHM, 1/4W, 1%
0027	472140		1	RESISTOR, 332K OHM, 1/4W, 1%
0028	472185		1	RESISTOR, 61.9K OHM, 1/4W, 1%
0029	472270		1	RESISTOR, 1.2M OHM, 1/4W, 1%, METAL FILM
0030	474181		1	RESISTOR, 4.3 OHM, 1W, 5%, METAL OXIDE
0031	481022		1	DIODE, ZENER, BZY88C12, 12V, 500MW
0032	481530		1	DIODE, KBU4D, 4 AMP, BRIDGE RECTIFIER
0033	481541		1	DIODE, UF4002, 100V, 1A, FAST RECOVERY
0034	481542		2	DIODE, UF5400, 50V, 3A, FAST RECOVERY
0035	484529		1	VOLTAGE REGULATOR, LM78L05ACZ, 5V, 100MA, TO-
0036	484539		1	VOLTAGE REGULATOR, LT1076CT, 2A, STEP-DOWN, T
0037	485517		1	TRANSISTOR, VN10KM, N-CHANNEL, F.E.T
0038	485527		1	MOSFET, IRF9523,.8 OHMS, 60V, P-CHANNEL, TO-
0039	486716		1	LM393NDUAL COMPARATOR
0040	515046		1	FUSE, 2 AMP, 250V, SLO-BLO, IEC127-II
0042	515503		2	FUSE HOLDER, FOR 5MM FUSES, PC MT, SILVER PLA
0044	161049		0	ADHESIVE, HOT MELT, GENERAL PURPOSE, TAN COLO
0045	260014		1	HEATSINK, BLACK ANODISED
0046	281500		0	NUT, HEX, NO. 4-40, STEEL, CADMIUM PLATE
0047	284200		0	#4-40 X 1/4 SLOTTED BINDING HEAD STEEL CAD. P
0048	285000		0	LOCK WASHER, NO. 4, INTERNAL TOOTH, STEEL, CA

2725-01 00 Power Supply Board Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	2725-03	00	0	SCHEMATIC, POWER SUPPLY BOARD, MODEL 515B & 5
0002	2725-04	00	0	TEST PROCEDURE, POWER SUPPLY BOARD, 515B & 51
0003	2725-17	00	1	POWER SUPPLY BOARD SUBASSY, MODEL 515B & 515C

2725-17 00 Power Supply Board Subassy

PART NO	QPA	DESCRIPTION
152029	1	CAPACITOR, 220UF 20%, 35V, ALUM, ELECTROLYTIC
152081	1	CAPACITOR, 6800UF, 35V, 20%, AL, ELECTROLYTIC
154072	5	CAPACITOR,.1UF, 50V, 10%, X7R, CER CHIP, S M
180014	1	INDUCTOR, 25UH,.25 SPACING, PC MOUNT
211213	1	CONNECTOR, 2 PIN, POST HEADER
211505	1	CONNECTOR, 5 PIN, SQ POST HEADER,.156 SP, FR
2725-02	1	FAB, POWER SUPPLY BOARD, 2ND GENERATION
280108	0	SNAP RIVET
474145	1	RESISTOR, 215 OHM, 1/8W, 1%, SURFACE MOUNT
474165	1	RESISTOR, 10K OHM, 1/8W, 1%, SURFACE MOUNT
474166	3	RESISTOR, 100K OHM, 1/8W, 1%, SURFACE MOUNT
474167	1	RESISTOR, 2.2M OHM, 1/8W, 1%, SURFACE MOUNT
474181	1	RESISTOR, 4.3 OHM, 1W, 5%, METAL OXIDE
474211	1	RESISTOR, 49.9K OHM, 1/8W, 1%, 1206 STYLE, S

PART NO	QPA	DESCRIPTION
474214	2	RESISTOR, 332K OHM, 1/8W, 1%, 1206 STYLE, SRF
474215	1	RESISTOR, 2.21K OHM, 1/8W, 1%, 1206 STYLE, SR
474216	1	RESISTOR, 4.99K OHM, 1/8W, 1%, 1206 STYLE, SR
474217	1	RESISTOR, 26.1K OHM, 1/8W, 1%, 1206 STYLE, SR
474218	1	RESISTOR, 47.5K OHM, 1/8W, 1%, 1206 STYLE, SR
474219	1	RESISTOR, 61.9K OHM, 1/8W, 1%, 1206 STYLE, SR
481044	1	DIODE, ZENER, BZX84C12LT1, 12V, SURFACE MOUNT
481530	1	DIODE, KBU4D, 4 AMP, BRIDGE RECTIFIER
481552	2	DIODE, MBRS340T3, SCHOTTKY, 40V, 3A, SURFACE
484559	1	VOLT RGLR, LT1076CT FLOW 30, 2A, STEP DOWN, T
485532	1	TRANSISTOR, 2N7002T1, N-CHAN ENHAN MODE, SURF
485535	1	TRANSISTOR, IRFD9020, P-CHANNEL, MOSFET, 4 PI
486805	1	IC, LM393M, DUAL VOLTAGE COMP, L PWR, SURFACE
515085	1	FUSE W FUSEHOLDER, 2A, 125V, SLO-BLO, SUBMIN,
5918-10	1	XFMR, MAINS, PWR SPLY BD, 515A SB/520A/1265/7

6487-01 00 Rear Panel Assy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	2725-01	00	1	POWER SUPPLY BOARD ASSY, MODEL 515B & 515C
0002	5812-10	00	2	SPACER, SUPPORT, OXYPLETH - 520A
0003	5819-01	02	1	GROUND WIRE ASSY, 3 1/2 IN. L, 0XYPLETH - 520
0004	6487-17	00	1	REAR PANEL SUBASSY, MODEL 515B & 515C
0005	6497-01	00	1	GROUND WIRE ASSY, POWER ENTRY MODULE, 515B &
0006	6498-01	00	1	POWER CABLE ASSY, REAR PANEL, MODEL 515B & 51
0012	210149		1	POWER ENTRY MODULE, SEL FUSE, ON/OFF SW & RFI
0013	216059		1	CONNECTOR, PLUG, POTENTIAL COMPENSATION
0014	280225		0	STANDOFF, 1/2 DIA X 1/2 L, 6-32 F THD, AL W I
0015	281501		0	NUT, HEX, NO. 6-32, STEEL, CADMIUM PLATE
0016	285001		0	LOCK WASHER, NO. 6, INTERNAL TOOTH, STEEL, CA
0017	285005		0	FLAT WASHER, NO. 8, STEEL, CAD PL
0018	286219		0	SCREW, 6-32 X 1 1/4 (31.8) L, PAN HD, PHILLIP
0019	515023		2	FUSE, 1/2A, 250V, SLO-BLO, 5 X 20MM, IEC-127-
0020	161008		0	ADHESIVE, 242, THREADLOCKER, MED STR, BLUE, 1

6487-17 00 Rear Panel Subassy

LINE	PART NO	REV	QPA	DESCRIPTION
0001	6487-10	02	1	REAR PANEL, MODEL 515B & 515C
0002	6487-32	00	1	FACEPLATE, REAR PANEL, MODEL 515B & 515C

13 Schematics and Assembly Drawings

6500-00	Final Assy, Model 515B
6500-09	Overall Wiring Diagram, Model 515B
6500-01	Assy, Model 515B
6550-00	Final Assy, Model 515C
6550-09	Overall Wiring Diagram, Model 515C
6550-01	Assy, Model 515C
6376-01	Rear Panel Assy
2532-01	Power Supply Assy.
2532-03	Schematic, Power Supply Bd.
6487-01	Rear Panel Assy
2725-01	Power Supply Assy.
2725/2726-03	Schematic, Power Supply Bd.
2721-01	Main Board Assy, Model 515B
2722-01	Main Board Assy, Model 515C
2721/2722-03	Schematic, Main Bd. Model 515B/C
2723-01	Main Board Assy
2724-01	Main Board Assy
2723/2724-03	Schematic, Main Board, Model 515B/C

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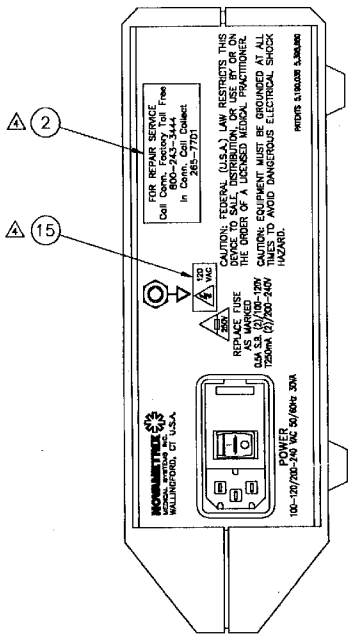
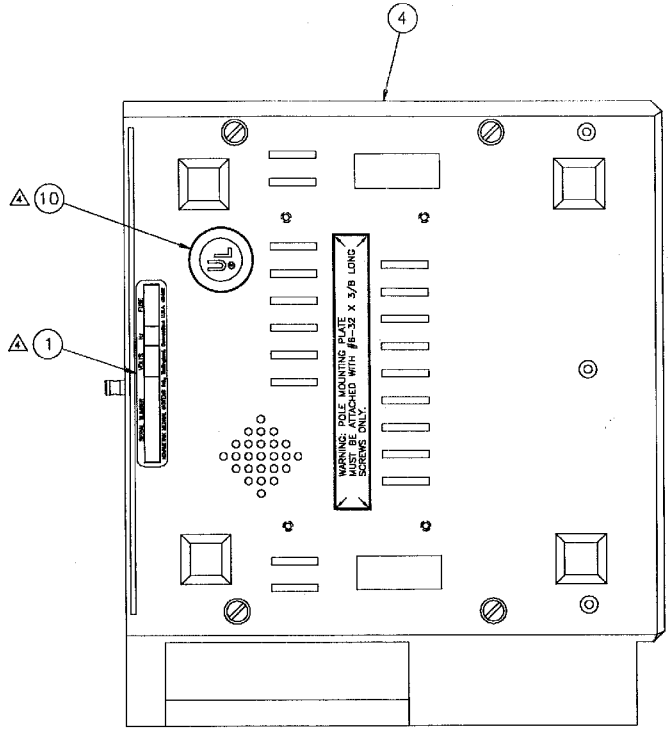
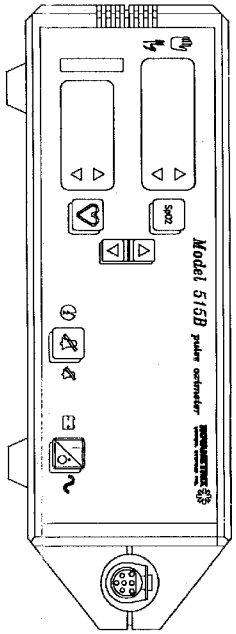
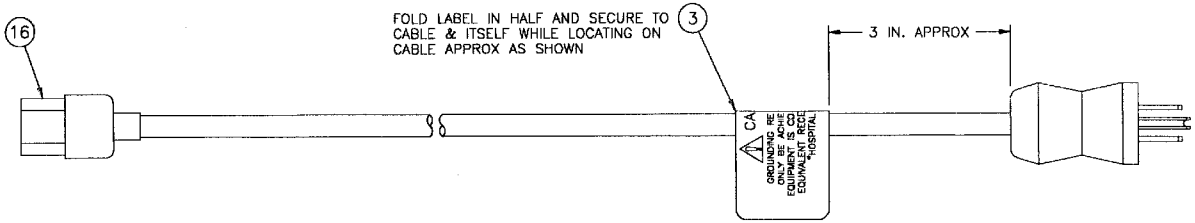

FOR REPAIR SERVICE
Call Comm. Factory Toll Free
800-243-3444
In Conn. Call Collect
265-7701
CAUTION: FEDERAL (U.S.A.) LAW RESTRICTS THIS DEVICE TO SALE, DISTRIBUTION, OR USE BY OR ON THE ORDER OF A LICENSED MEDICAL PRACTITIONER.
CAUTION: EQUIPMENT MUST BE GROUNDED AT ALL TIMES TO AVOID DANGEROUS ELECTRICAL SHOCK HAZARD.
PATENTS 5,190,038 5,365,930
REPLACE FUSE AS MARKED
0.5A S.B. (2)/100-120V
750mA (2)/200-240V
POWER
100-120/200-240 VAC 50/60Hz 30VA
NOVAMETRIX MEDICAL SYSTEMS INC.
WALLINGFORD, CT U.S.A.






FOLD LABEL IN HALF AND SECURE TO CABLE & ITSELF WHILE LOCATING ON CABLE APPROX AS SHOWN
3 IN. APPROX
GROUNDING RE
ONLY BE ACHIE
EQUIPMENT IS CO
EQUIPOTENTIAL
HOSPITAL

NOTES:
1. FOR SYSTEM TEST PROCEDURE SEE A6500-04.
2. FOR OVERALL WIRING DIAGRAM SEE D6500-09.
3. WIPE UNIT CLEAN WITH ISOPROPYL ALCOHOL.
⚠ LOCATE LABELS APPROXIMATELY AS SHOWN.
5. INCLUDE USERS MANUAL, A6500-23 WITH MONITOR.

REV	R NO.	DATE
02	N372	16Oct95
01	N372	28Sep95

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm)
BREAK ALL SHARP EDGES
TOLERANCES
DEC ± .~ (mm) ± .~
FRAC ± .~ (mm) ± .~
HOLES .007 -.003 (mm) (+.13 -.08)
ANG ± .~
MATERIAL ~
FINISH ~

TITLE: PULSE OXIMETER, MODEL 515B

DRAWN MRL 11Apr95 | CHECKED MRL
MFG ENGR EH 4-20-95 | APPROVED AJE 4/20/95
USED ON ~

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO.	CODE	REV
D	6500	00	02

SCALE: 1/1 SHEET 1 OF 1

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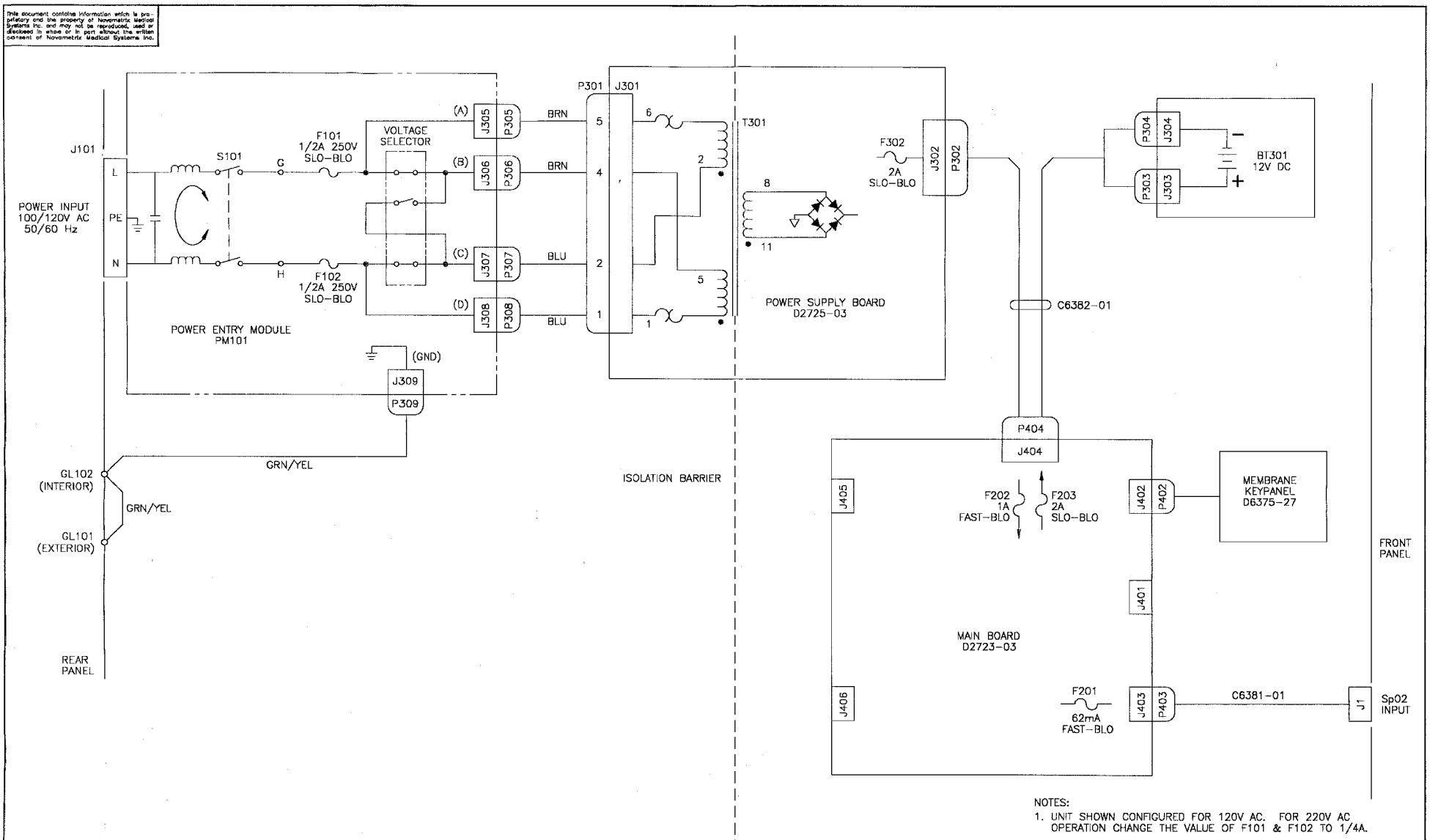

NOTES:

1. UNIT SHOWN CONFIGURED FOR 120V AC. FOR 220V AC OPERATION CHANGE THE VALUE OF F101 & F102 TO 1/4A.

REV	R NO.	DATE
02	N372	17Oct95
01	N372	27Sep95

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES (mm)
BREAK ALL SHARP EDGES
TOLERANCES
DEC .x = (mm) (±)
FRAC x = (mm) (±)
HOLES +.007 -.003 (mm) (±)
ANG x = (±)
MATERIAL ~
FINISH ~

TITLE: OVERALL WIRING DIAGRAM, MODEL 5158

DRAWN MRL 6Mar95 | CHECKED MRL
MFG ENGR EH 4-20-95 | APPROVED AJE 4/11/95
USED ON: D6500-00

NOVAMETRIX MEDICAL SYSTEMS INC.
WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO.	CODE	REV
D	6500	09	02

SCALE: NONE | SHEET 1 OF 1

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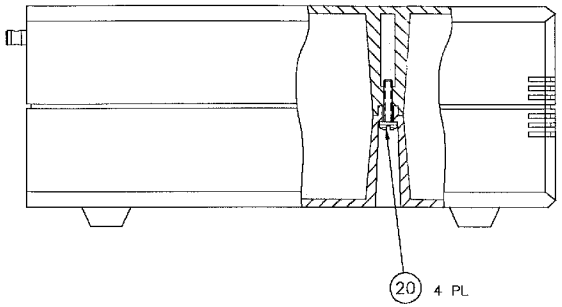
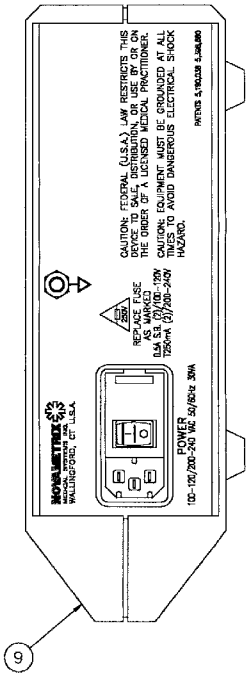
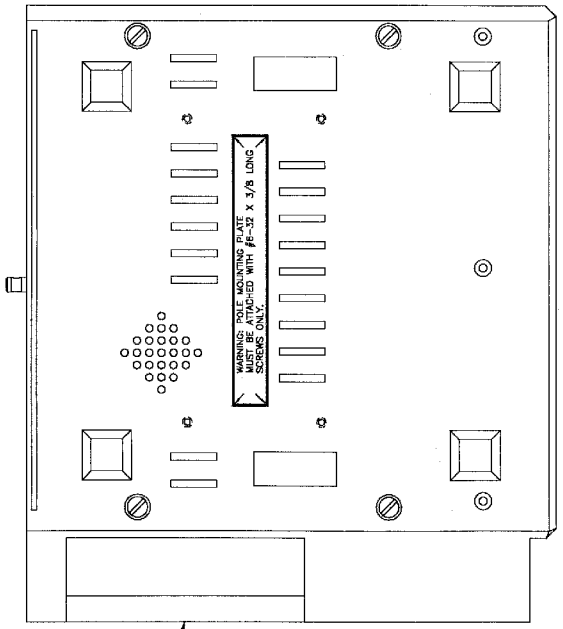
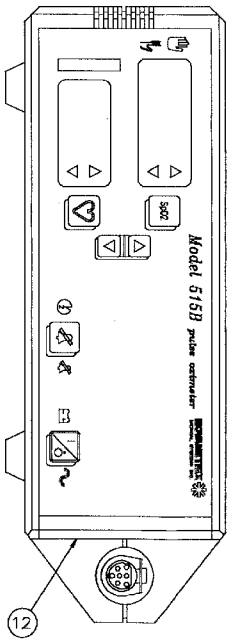



CAUTION: FEDERAL (U.S.A.) LAW RESTRICTS THIS DEVICE TO SALE, DISTRIBUTION, OR USE BY OR ON THE ORDER OF A LICENSED MEDICAL PRACTITIONER.
CAUTION: EQUIPMENT MUST BE GROUNDED AT ALL TIMES TO AVOID DANGEROUS ELECTRICAL SHOCK HAZARD.
PATENTS 5,193,538 5,368,040
REPLACE FUSE AS MARKED 0.5A 250V
115 VAC (±10%) 60Hz 125V 1250mA (T) 220-240V
POWER
100-120/200-240 VAC 50/60Hz 30VA
NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT. U.S.A.
9



FOR MONITOR SUBASSY
SEE SHEET 2



			DO NOT SCALE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES TOLERANCES DEC ± ~ (mm) ± ~ FRAC ± ~ (mm) ± ~ HOLES +.007 −.003 (+.18 −.08) ANG ± ~	TITLE: MAIN ASSY, MODEL 5158	NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A 06492	
03	N372	13Oct95	MATERIAL ~	DRAWN MRL 28Apr95	CHECKED MRL 28Apr95	
02	N372	28Sep95		MFG ENGR EH 4-28-95	APPROVED AJE 4/28/95	SIZE D / DRAWING NO. 6500 / CODE 01 / REV 03
01	N383	27Apr95	FINISH ~	USED ON: 06500-00		SCALE: 1/1 / SHEET 1 OF 2
REV	R NO.	DATE				

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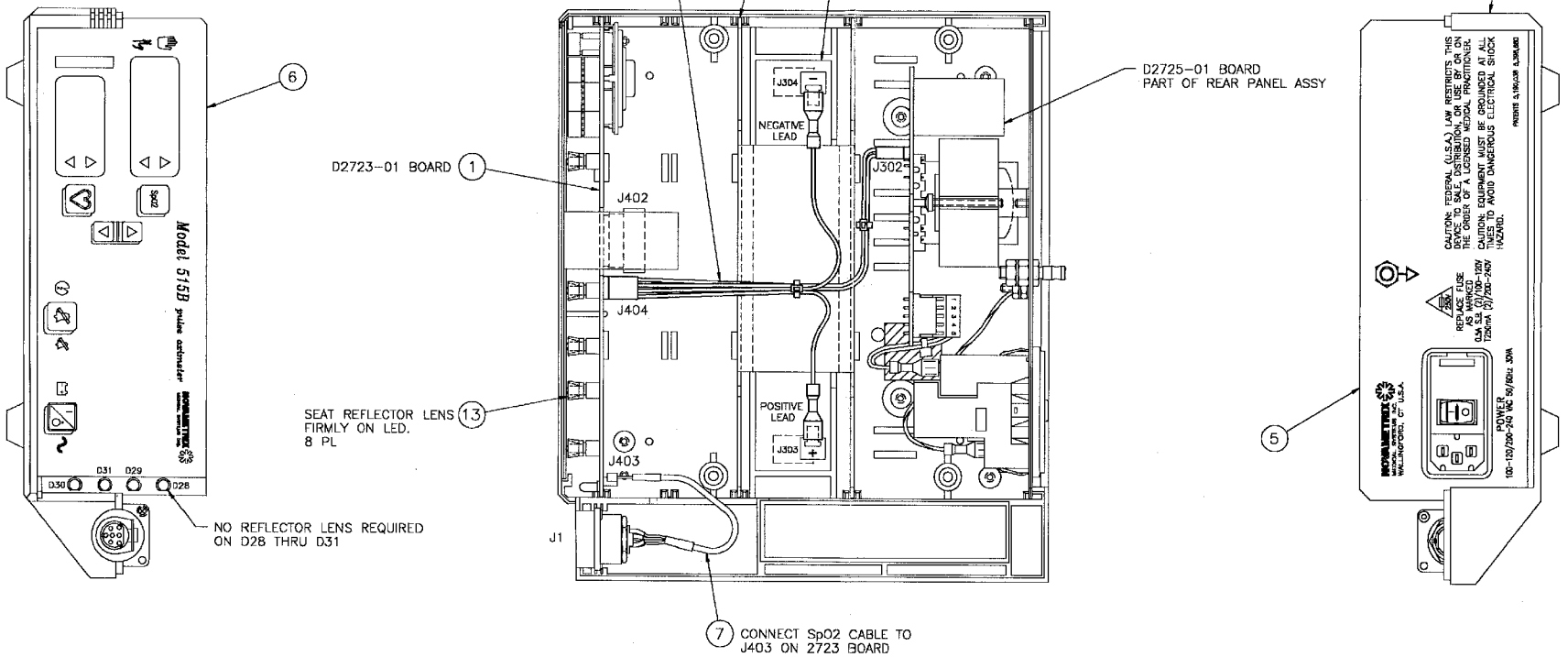
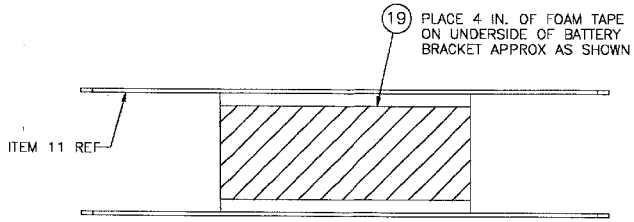

11 SEE DETAIL A FOR BATTERY BRACKET SUBASSY
CONNECT POWER HARNESS FROM J404 ON 2723 BD TO J303(+) & J304(–) ON BT1 AND J302 ON 2725 BD
8
21 BT1 REMOVE LINER FROM TAPE (2 PL) IN BOTTOM COVER BEFORE PLACING BATTERY IN CASE
10
6
D2723-01 BOARD 1
D2725-01 BOARD PART OF REAR PANEL ASSY
J304
NEGATIVE LEAD
J302
J402
J404
SEAT REFLECTOR LENS 13 FIRMLY ON LED. 8 PL
POSITIVE LEAD
J303
J403
J1
5
Model 515B pulse oximeter
D30 D31 D29 D28
NO REFLECTOR LENS REQUIRED ON D28 THRU D31
7 CONNECT SpO2 CABLE TO J403 ON 2723 BOARD
CAUTION: FEDERAL (U.S.A.) LAW RESTRICTS THIS DEVICE TO SALE, DISTRIBUTION, OR USE BY OR ON THE ORDER OF A LICENSED MEDICAL PRACTITIONER.
CAUTION: EQUIPMENT MUST BE GROUNDED AT ALL TIMES TO AVOID DANGEROUS ELECTRICAL SHOCK HAZARD.
REPLACE FUSE AS MARKED
0.5A S.B. (2)/100–120V
125mA (2)/220–240V
POWER
100–120/220–240 VAC 50/60Hz 30VA
NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A.



DETAIL A

REV	R NO.	DATE
03	N372	18Oct95
02	N372	28Sep95
01	N363	27Apr95

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm)
BREAK ALL SHARP EDGES
TOLERANCES
DEC 4 = ~ (mm) ± ~
FRAC ± = ~ (mm) ± ~
HOLES +.007 –.003 (mm) (+.18 –.08)
ANG ± = ~
MATERIAL ~
FINISH ~

TITLE: MAIN ASSY, MODEL 515B

DRAWN MRL 28Apr95 | CHECKED MRL 28Apr95
MFG ENGR EH 4-28-95 | APPROVED AJE 4/28/95
USED ON: 06500-00

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO.	CODE	REV
D	6500	01	03

SCALE: 1/1 SHEET 2 OF 2

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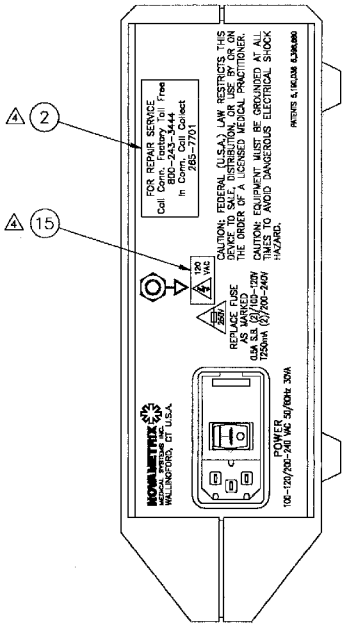
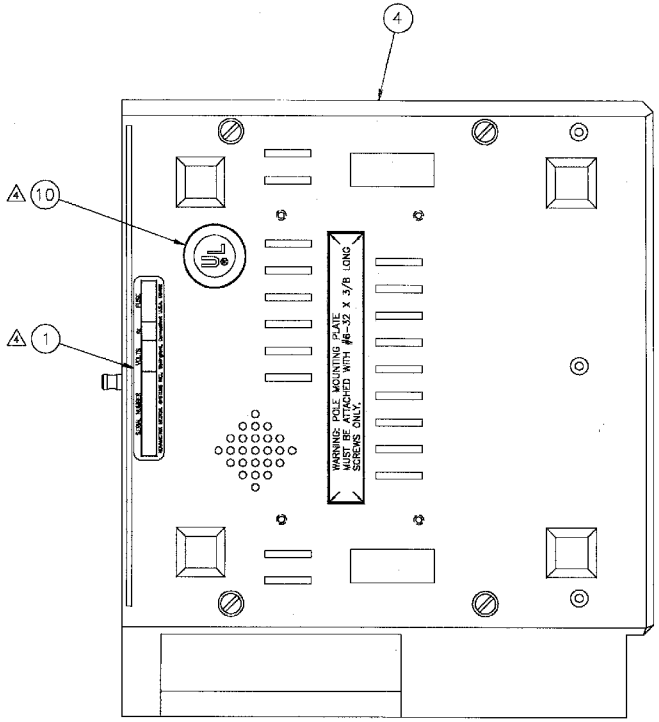
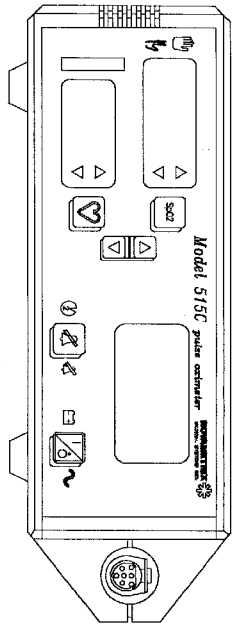
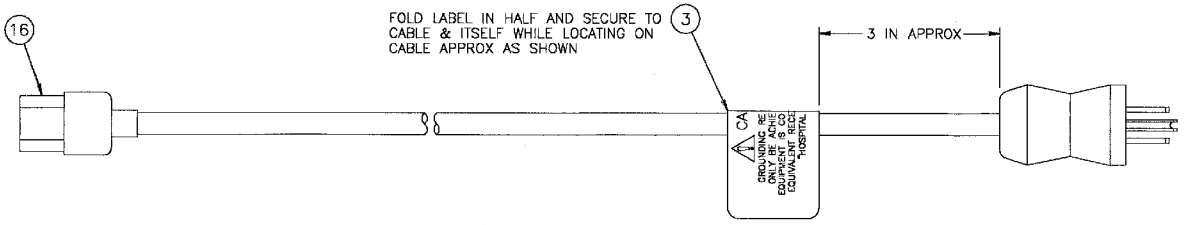

FOR REPAIR SERVICE
Call Customer Service Toll Free
800-243-3444
In Conn, Call Collect
785-7701
CAUTION: FEDERAL (U.S.A.) LAW RESTRICTS THIS DEVICE TO SALE, DISTRIBUTION, OR USE BY OR ON THE ORDER OF A LICENSED MEDICAL PRACTITIONER.
CAUTION: EQUIPMENT MUST BE GROUNDED AT ALL TIMES TO AVOID DANGEROUS ELECTRICAL SHOCK HAZARD.
PATENTS 4,700,708 4,714,080
120 VAC
250V
REPLACE FUSE AS MARKED
T250mA (2)/100-120V
T125mA (2)/200-240V
POWER
100-120/220-240 VAC 50/60Hz 30VA
NOVAMETRIX
MEDICAL SYSTEMS, INC.
WALLINGFORD, CT U.S.A.






FOLD LABEL IN HALF AND SECURE TO CABLE & ITSELF WHILE LOCATING ON CABLE APPROX AS SHOWN
3 IN APPROX
GROUNDING ME ONLY WHEN THE EQUIPMENT IS CO EQUIVALENT RECE HOSPITAL

NOTES:
1. FOR SYSTEM TEST PROCEDURE SEE A6550-04.
2. FOR OVERALL WIRING DIAGRAM SEE D6550-09.
3. WIPE UNIT CLEAN WITH ISOPROPYL ALCOHOL.
4. LOCATE LABELS APPROXIMATELY AS SHOWN.
5. INCLUDE USERS MANUAL, A6550-23 WITH MONITOR.

REV	R NO.	DATE
02	N372	18Oct95
01	N372	28Sep95

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm)
BREAK ALL SHARP EDGES
TOLERANCES
DEC ± .=
FRAC ± =
HOLES +.007 -.003 (mm) (+.18 -.08)
ANG ± =
MATERIAL ~
FINISH ~

TITLE
PULSE OXIMETER WITH GRAPHICS, MODEL 515C

DRAWN MRL 11Apr95 | CHECKED MRL
MFG ENGR KH 4-20-96 | APPROVED AJE 4/30/96
USED ON: ~

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO.	CODE	REV
D	6550	00	02

SCALE: 1/1 SHEET 1 OF 1

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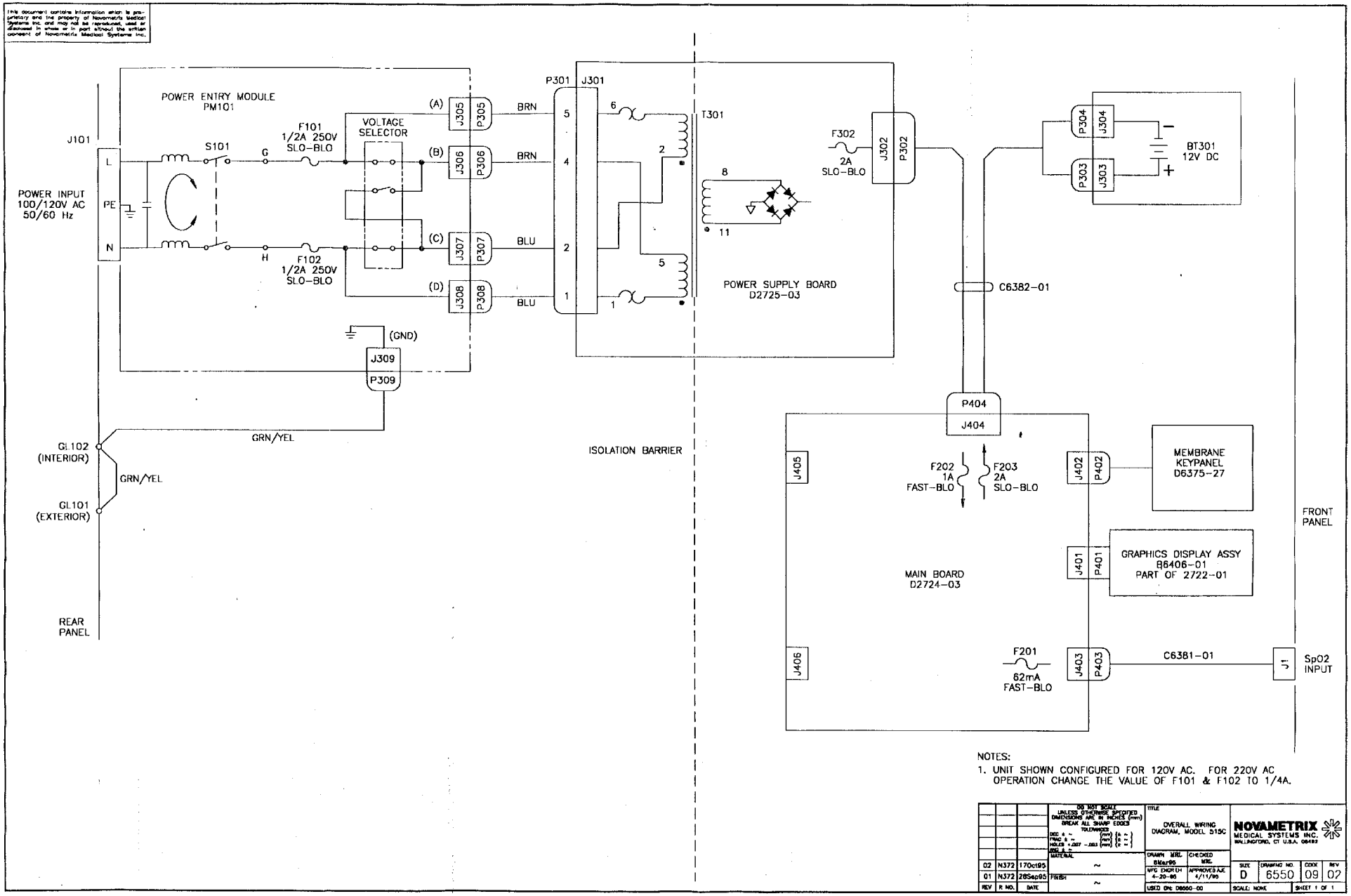

NOTES:

1. UNIT SHOWN CONFIGURED FOR 120V AC. FOR 220V AC OPERATION CHANGE THE VALUE OF F101 & F102 TO 1/4A.

REV	R NO.	DATE
02	N372	17Oct95
01	N372	28Sep95

DO NOT SCALE. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES TOLERANCES DEC ± .1 (mm) FRAC ± 1/64 (mm) HOLES ± .007 - .003 (mm) ANG ± 2° MATERIAL ~ FINISH ~

TITLE: OVERALL WIRING DIAGRAM, MODEL 515C

DRAWN MRL 6Mar95 | CHECKED MRL | MFG ENGR'G 4-20-95 | APPROVED A.K. 4/11/95

USED ON: D8660-00

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO.	CODE	REV
D	6550	09	02

SCALE: NONE | SHEET 1 OF 1

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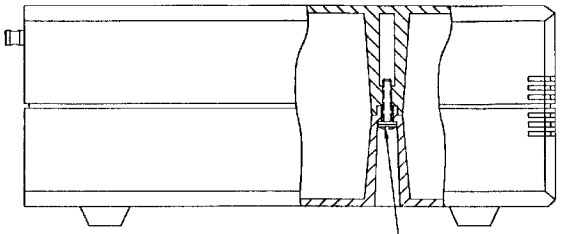

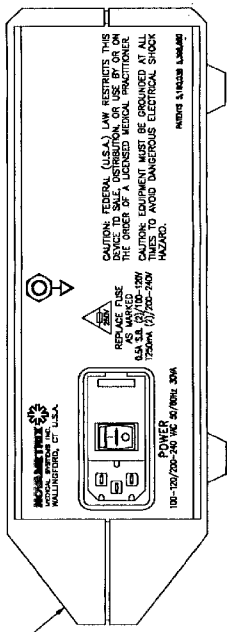
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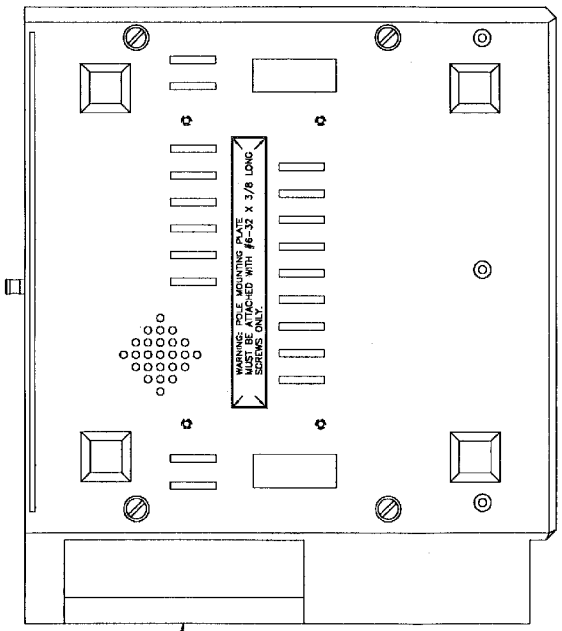
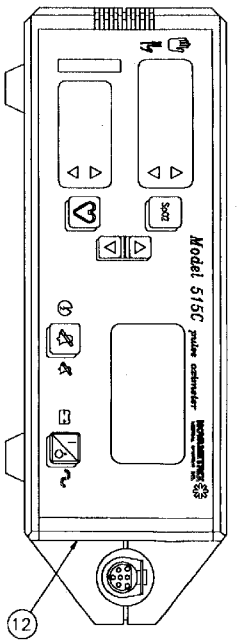
CAUTION: EQUIPMENT MUST BE GROUNDED AT ALL TIMES TO AVOID DANGEROUS ELECTRICAL SHOCK HAZARD.
REPLACE FUSE AS MARKED
POWER
100-120/220-240 VAC 50/60Hz 30VA
9



FOR MONITOR SUBASSY
SEE SHEET 2



REV	N. NO.	DATE
03	N372	18Oct95
02	N372	28Sep95
01	N363	13Apr95

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm)
BREAK ALL SHARP EDGES
TOLERANCES
DEC X = ± (mm)
FRAC X = ± (mm)
HOLES +.007 -.003 (+.18 -.08)
ANG X = ±
MATERIAL ~
FINISH ~

TITLE: MAIN ASSY, MODEL 515C

DRAWN	DATE	CHECKED	DATE
	11Apr95		28Apr95
MFG ENGR		APPROVED	
	4-28-95		4/28/95

USED ON: 08660-00

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO.	CODE	REV
D	6550	01	03

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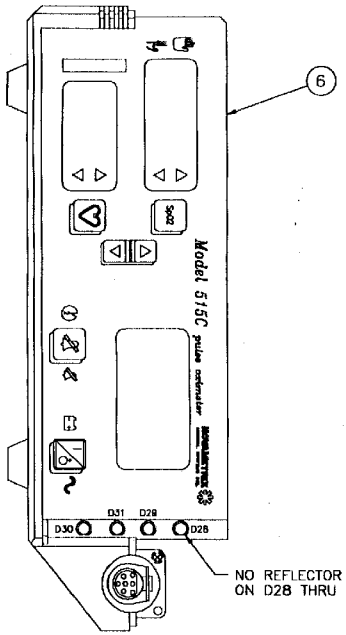


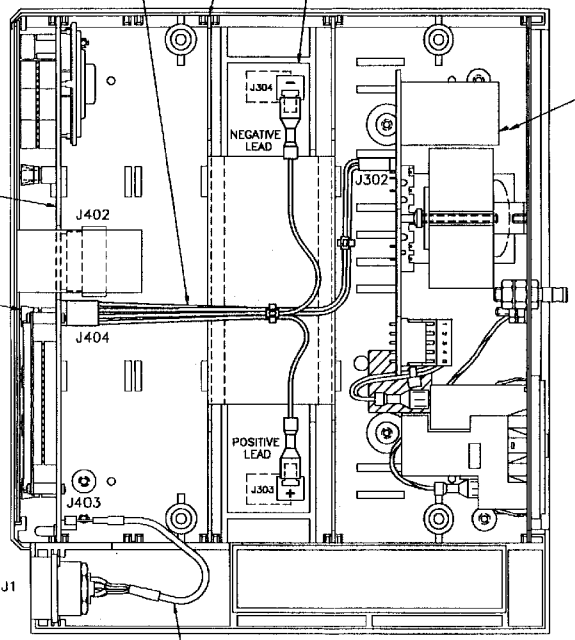
6

NO REFLECTOR LENS REQUIRED ON D28 THRU D31

CONNECT POWER HARNESS FROM (8) J404 ON 2724 BD TO J303(+) & J304(−) ON BT1 AND J302 ON 2725 BD

(11) SEE DETAIL A FOR BATTERY BRACKET SUBASSY

(21) BT1
REMOVE LINER FROM TAPE (2 PL) IN BOTTOM COVER BEFORE PLACING BATTERY IN CASE

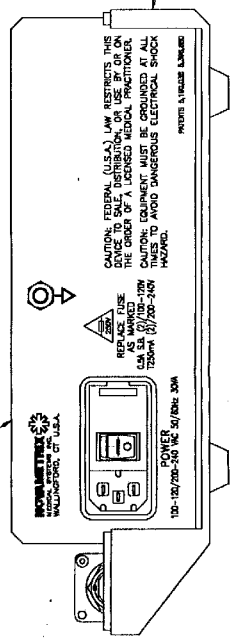


D2724-01 BOARD (1)

SEE DETAIL B FOR LED SUBASSY

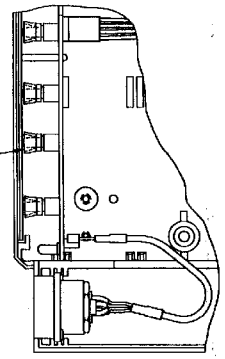
D2725-01 BOARD
PART OF REAR PANEL ASSY

(7) CONNECT SpO2 CABLE TO J403 ON 2724 BOARD


CAUTION: FEDERAL (U.S.A.) LAW RESTRICTS THIS DEVICE TO SALE, DISTRIBUTION, OR USE BY OR ON THE ORDER OF A LICENSED MEDICAL PRACTITIONER.
CAUTION: EQUIPMENT MUST BE GROUNDED AT ALL TIMES TO AVOID DANGEROUS ELECTRICAL SHOCK HAZARD.
REPLACE FUSE AS MARKED
POWER
100-120/220-240 VAC 50/60Hz 30VA

10

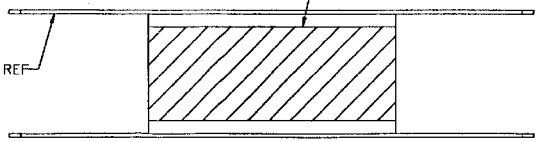
5



SEAT REFLECTOR LENS (13) FIRMLY ON LED. 8 PL

DETAIL B

(19) PLACE 4 IN. OF FOAM TAPE ON UNDERSIDE OF BATTERY BRACKET APPROX AS SHOWN



DETAIL A

REV	R NO.	DATE	DO NOT SCALE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES TOLERANCES DEC # ± (mm) ± FRAC ± (mm) ± HOLES +.007 −.003 (+.18 −.08) ANG ± MATERIAL FINISH	TITLE: MAIN ASSY, MODEL 515C	NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492
03	N372	18Oct95		DRAWN MRL 11Apr90	CHECKED MRL 28Apr95
02	N372	28Sep95	~	MFG ENGR EH 4-28-95	APPROVED AJE 4/28/95
01	N363	13Apr95	~	USED ON: D6550-05	SIZE D · DRAWING NO. 6550 · CODE 01 · REV 03
					SCALE: 1/1 · SHEET 2 OF 2

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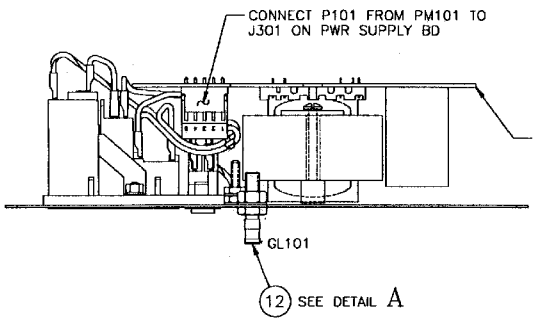
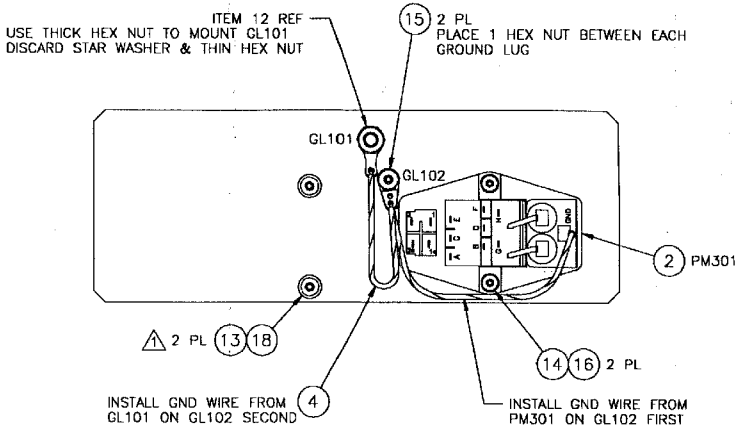
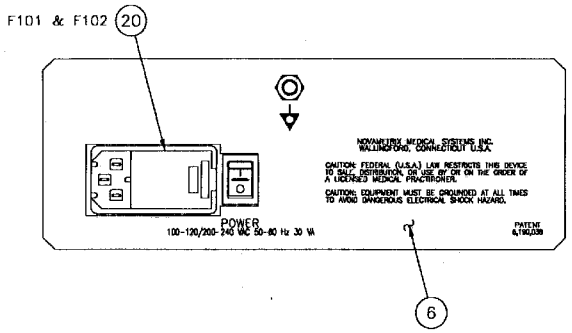
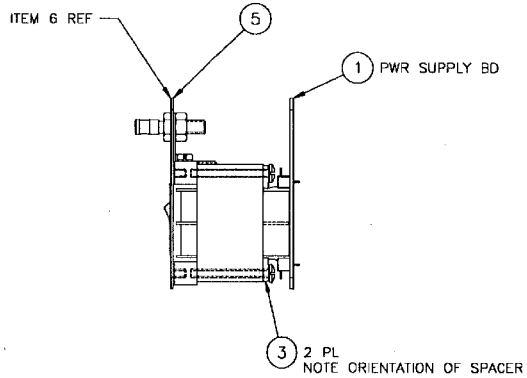
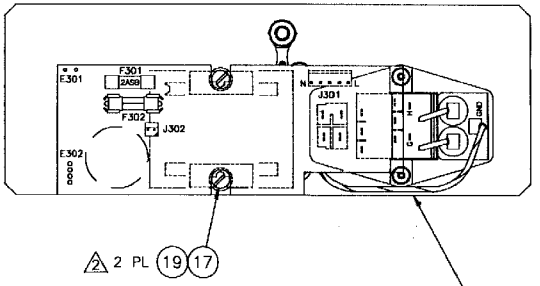



ITEM 12 REF
USE THICK HEX NUT TO MOUNT GL101
DISCARD STAR WASHER & THIN HEX NUT
15 2 PL
PLACE 1 HEX NUT BETWEEN EACH GROUND LUG
GL101
GL102
2 PM301
1 2 PL 13 18
14 16 2 PL
INSTALL GND WIRE FROM GL101 ON GL102 SECOND 4
INSTALL GND WIRE FROM PM301 ON GL102 FIRST

DETAIL A







NOTES:

1. APPLY A SMALL DROP OF ADHESIVE, ITEM 11, TO STUDS, ITEM 5, BEFORE ASSEMBLY.
2. APPLY A SMALL DROP OF ADHESIVE, ITEM 11, TO SCREWS, ITEM 19, BEFORE ASSEMBLY.

REV	R NO.	DATE	DO NOT SCALE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES TOLERANCES DEC ± .- (mm) (± .-) FRAC ± .- (mm) (± .-) HOLES ± .007 -.003 (mm) (± .-) ANG ± .- MATERIAL ~ FINISH ~	TITLE: REAR PANEL ASSY, MODEL 515B & 515C	NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492
				DRAWN BOD 09/29/98 CHECKED JOB. 09/29/98 MFG ENGR ER 9-29-98 APPROVED AJE 9/29/98 USE ON: 06600/6660-01	SIZE D DRAWING NO. 6376 CODE 01 REV 00 SCALE: 1/1 SHEET 1 OF 1

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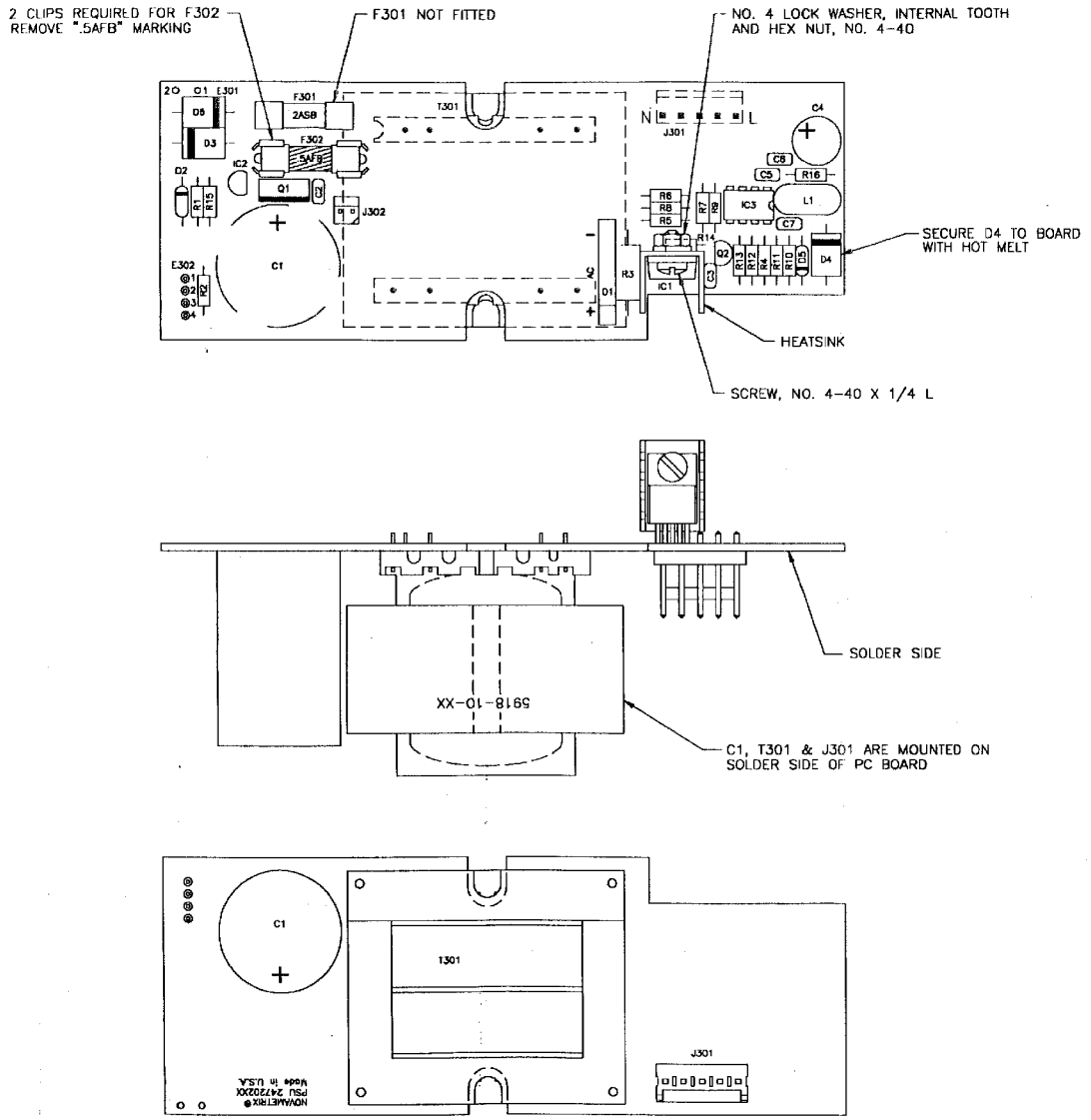

PN	DESCRIPTION	REF DES
2472-02	FAB, POWER SUPPLY BOARD	~
02532-03	SCHEMATIC, POWER SUPPLY BOARD	~
A2532-04	TEST PROCEDURE, POWER SUPPLY BOARD	~
D5918-10	TRANSFORMER, MAINS	T301
152029	CAPACITOR, 220uF, 35V, ELECTROLYTIC	C4
152081	CAP, 6800uF, 35V, ±20%, AL, ELECTROLYTIC	C1
154016	CAPACITOR, .1uF, 50V, DIPPED CERAMIC	C2, C3, C5-C7
181049	ADHESIVE, HOT MELT, GENERAL PURPOSE, TAN	FOR L1
180014	INDUCTOR, 25uH	L1
211213	CONNECTOR, 2 PIN, POST HEADER	J302
211505	CONNECTOR, 5 PIN, POST HDR, FRICTION LOCK	J301
260014	HEATSINK, BLACK ANODIZED	FOR IC1
281500	NUT, HEX, 4-40, STEEL	FOR IC1
284200	SCREW, BINDING HD, 4-40 X 1/4 L, SLOTTED	FOR IC1
286000	LOCK WASHER, NO. 4, INTERNAL TOOTH	FOR IC1
470028	RESISTOR, 150 OHM, 1/4W, 10%	R15
472005	RESISTOR, 249 OHM, 1/4W, 1%	R11
472018	RESISTOR, 2.21k OHM, 1/4W, 1%	R18
472022	RESISTOR, 4.99k OHM, 1/4W, 1%	R12
472030	RESISTOR, 10k OHM, 1/4W, 1%	R10
472044	RESISTOR, 26.1k OHM, 1/4W, 1%	R6
472049	RESISTOR, 49.9k OHM, 1/4W, 1%	R4
472058	RESISTOR, 100k OHM, 1/4W, 1%	R5, R7, R9
472065	RESISTOR, 200k OHM, 1/4W, 1%	R1
472148	RESISTOR, 47.5k OHM, 1/4W, 1%	R8
472140	RESISTOR, 332k OHM, 1/4W, 1%	R14
472185	RESISTOR, 81.9k OHM, 1/4W, 1%	R13
472270	RESISTOR, 1.2M OHM, 1/4W, 1%	R2
474181	RESISTOR, 4.3 OHM, 1W, 5%	R3
481022	DIODE, ZENER, BZY88C12, 12V, 500mW	D2
481530	DIODE, KBU4D, BRIDGE RECTIFIER, 4 AMP	D1
481541	DIODE, UF4002, 100V, 1A, FAST RECOVERY	D5
481542	DIODE, UF5400, 50V, 3A, FAST RECOVERY	D3, D4
484529	VOLTAGE REGULATOR, LM78L05ACZ, 5V, 100mA	IC2
484539	VOLTAGE REGULATOR, LT1076CT, 2A, TO-220	IC1
485517	TRANSISTOR, VN10KM, N-CHANNEL FET	Q2
485527	MOSFET, IRF9523, .8 OHMS, 60V, P-CHANNEL	Q1
486716	IC, LM393N, DUAL COMPARATOR	IC3
515046	FUSE, 2 AMP, 250V, SLO-BLO	F302

NOTES:
1. FOR TEST PROCEDURE SEE A2532-04.
2. COMPONENTS NOT FITTED TO THIS ASSY: D6, F301
3. PERMANENTLY MARK ASSEMBLY NUMBER "2532-01-XX" WITH CURRENT REVISION NUMBER.

			DO NOT SCALE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES TOLERANCES DEC ± ~ (mm) ± ~ FRAC ± ~ (mm) ± ~ HOLES +.007 -.003 (+.18 -.08) ANG ± ~ MATERIAL ~ FINISH ~	TITLE POWER SUPPLY BOARD ASSY, MODEL 5158 & 515C	NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492
				DRAWN MBL 10Mar95 / CHECKED MBL / MFG ENGR EH 5-30-95 / APPROVED AJE 5/30/95	SIZE D / DRAWING NO. 2532 / CODE 01 / REV 00
REV	R NO.	DATE		USED ON: 08900/8000-01	SCALE: 2/1 SHEET 1 OF 1

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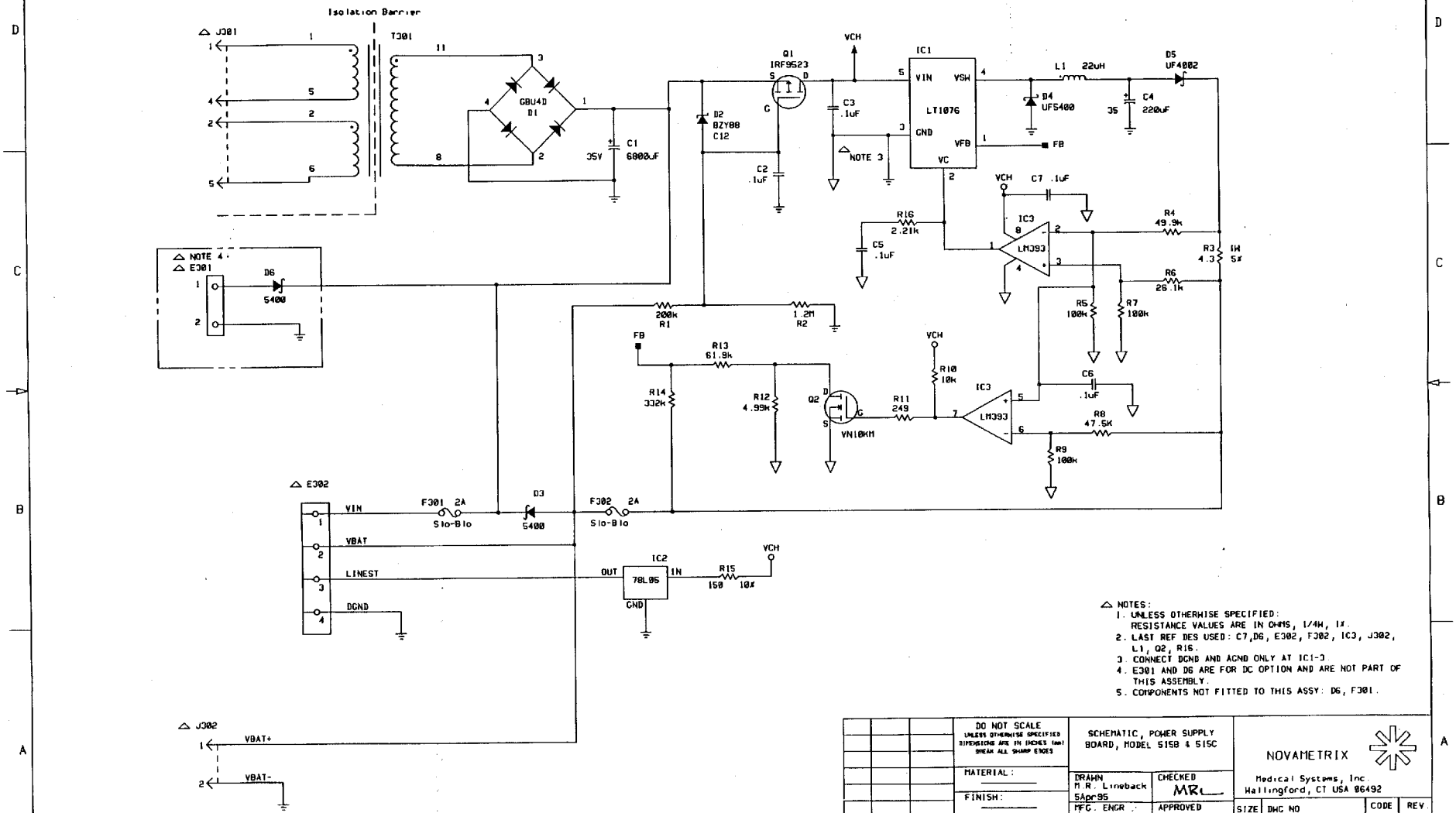

△ NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, 1/4W, 1%.
2. LAST REF DES USED: C7,D6, E302, F302, IC3, J302, L1, Q2, R16.
3. CONNECT DGND AND AGND ONLY AT IC1-3.
4. E301 AND D6 ARE FOR DC OPTION AND ARE NOT PART OF THIS ASSEMBLY.
5. COMPONENTS NOT FITTED TO THIS ASSY: D6, F301.

REV.	"R" NO.	BY	DATE

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES

MATERIAL:

FINISH:

FILE: 25320300
DATE: 5-Apr-95
TIME: 16:39:49

SCHEMATIC, POWER SUPPLY BOARD, MODEL 515B & 515C

DRAWN: M.R. Lineback 5Apr95
CHECKED: MRL
MFG. ENGR.:
APPROVED:

USED ON: 02532-01

NOVAMETRIX
Medical Systems, Inc.
Wallingford, CT USA 06492

SIZE	DWG NO	CODE	REV.
D	2532	03	00

SCALE: NONE
SHEET 1 OF 1

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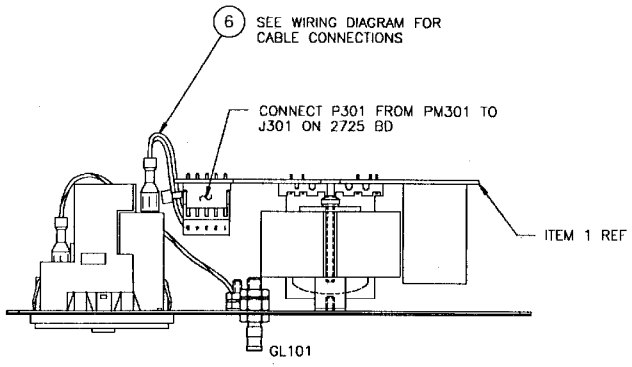
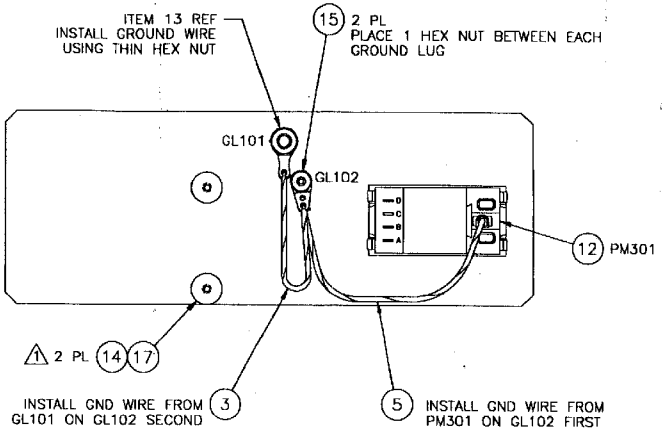
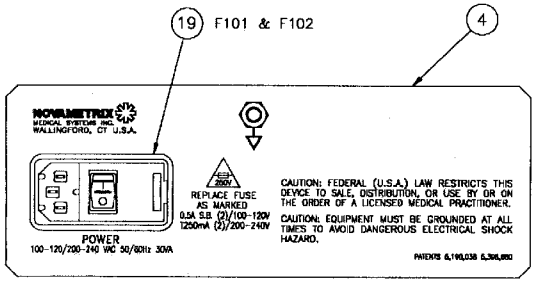
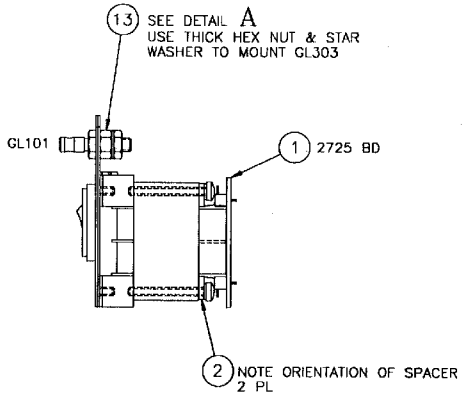
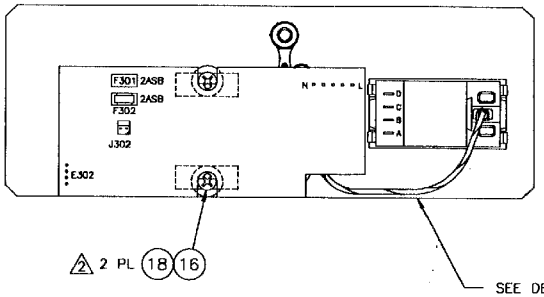


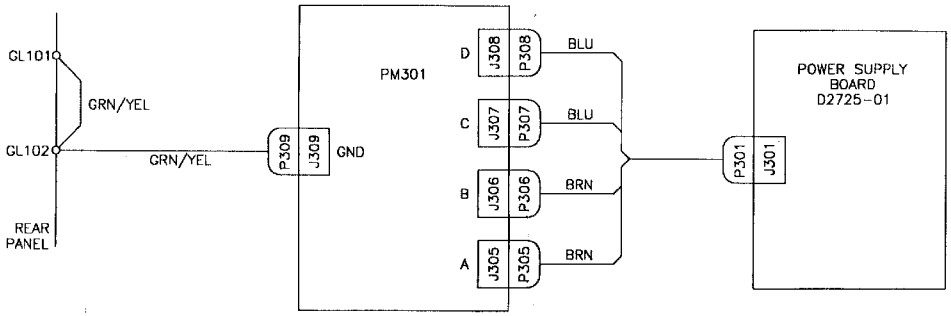

ITEM 13 REF INSTALL GROUND WIRE USING THIN HEX NUT
15 2 PL PLACE 1 HEX NUT BETWEEN EACH GROUND LUG
GL101
GL102
12 PM301
⚠1 2 PL 14 17
INSTALL GND WIRE FROM GL101 ON GL102 SECOND 3
5 INSTALL GND WIRE FROM PM301 ON GL102 FIRST

DETAIL A


19 F101 & F102
4
NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A.
250V
REPLACE FUSE AS MARKED
0.5A S.B. (2)/100-120V
1250mA (2)/200-240V
POWER
100-120/200-240 VAC 50/60Hz 30VA
CAUTION: FEDERAL (U.S.A.) LAW RESTRICTS THIS DEVICE TO SALE, DISTRIBUTION, OR USE BY OR ON THE ORDER OF A LICENSED MEDICAL PRACTITIONER.
CAUTION: EQUIPMENT MUST BE GROUNDED AT ALL TIMES TO AVOID DANGEROUS ELECTRICAL SHOCK HAZARD.
PATENTS 5,190,038 5,306,850







WIRING DIAGRAM

NOTES:

⚠1 APPLY A SMALL DROP OF ADHESIVE, ITEM 20, TO STUDS, ITEM 4, BEFORE ASSEMBLY.

⚠2 APPLY A SMALL DROP OF ADHESIVE, ITEM 20, TO SCREWS, ITEM 18, BEFORE ASSEMBLY.

			DO NOT SCALE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES TOLERANCES DEC X = FRAC ± HOLES ±.007 -.003 ANGL ± MATERIAL ~ FINISH ~	TITLE: REAR PANEL ASSY, MODEL 515B & 515C	NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492
				DRAWN BOB Gallup95	CHECKED BL 7Nov95
				MFG ENGR EH 11-7-95	APPROVED AJE 7Nov95
DO	N372	27Sep95		USE ON: 9500-01 & 9500-01	SCALE: 1/1
REV	R NO.	DATE			SIZE D | DRAWING NO. 6487 | CODE 01 | REV 00 | SHEET 1 OF 1

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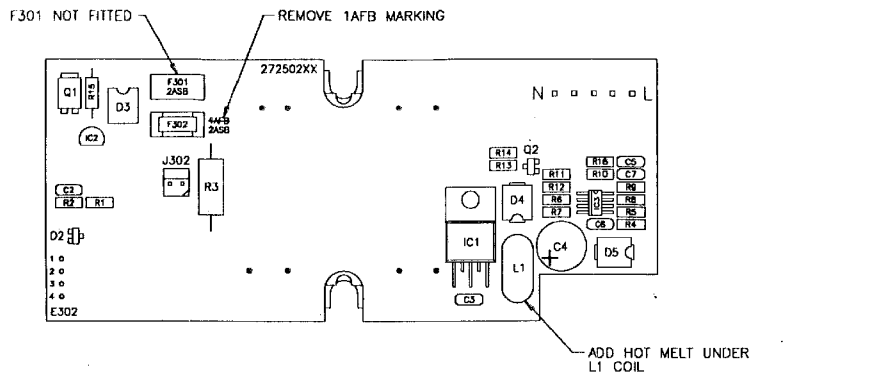

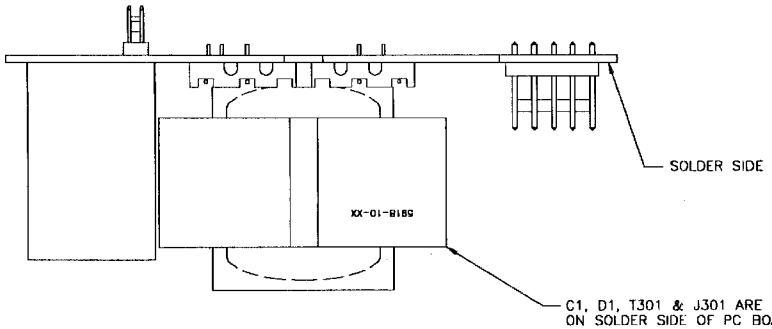

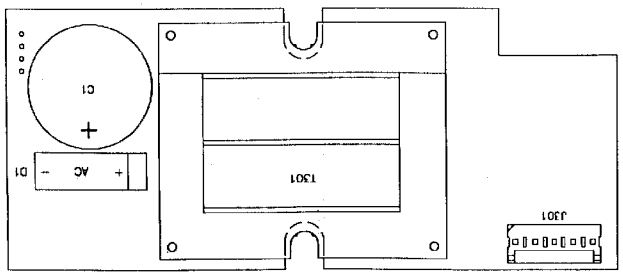

D2725-17 SUBASSEMBLY		
PN	DESCRIPTION	REF DES
2725-02	FAB, POWER SUPPLY BOARD, 2ND GENERATION	~
☆D5918-10	TRANSFORMER, MAINS, POWER SUPPLY BOARD	T301
☆ 152029	CAPACITOR, 220uF 20%, 35V, ELECTROLYTIC	C4
☆ 152081	CAPACITOR, 6800uF, 35V, 20%, ELECTROLYTIC	C1
154072	CAPACITOR, .1uF, 50V, 10%, X7R, CERAMIC CHIP	C2, C3, C5-C7
☆ 180014	INDUCTOR, 25uH, .25 SPACING	L1
☆ 211213	CONNECTOR, 2 PIN, POST HEADER	J302
☆ 211505	CONNECTOR, 5 PIN, SQUARE POST HEADER	J301
280108	SNAP RIVET	FOR IC1
474145	RESISTOR, 215 OHM, 1/8W, 1%	R11
474165	RESISTOR, 10k OHM, 1/8W, 1%	R10
474186	RESISTOR, 100k OHM, 1/8W, 1%	R5, R7, R9
474167	RESISTOR, 2.2M OHM, 1/8W, 1%	R2
☆474181	RESISTOR, 4.3 OHM, 1W, 5%	R3
474211	RESISTOR, 49.9k OHM, 1/8W,1%	R4
474214	RESISTOR, 332k OHM, 1/8W, 1%	R1, R14
474215	RESISTOR, 2.21k OHM, 1/8W, 1%	R16
474216	RESISTOR, 4.99k OHM, 1/8W, 1%	R12
474217	RESISTOR, 28.1k OHM, 1/8W, 1%	R8
474218	RESISTOR, 47.5k OHM, 1/8W, 1%	R8
474219	RESISTOR, 61.9k OHM, 1/8W, 1%	R13
481044	DIODE, ZENER, BZX84C12LT1, 12V	D2
☆ 481530	DIODE, KBU4D, 4 AMP, BRIDGE RECTIFIER	D1
481552	DIODE, MBRS340T3, SCHOTTKY, 40V, 3A	D4, D5
☆ 484559	VOLTAGE REGULATOR, LT1076CT FLOW 30, 2A	IC1
485532	TRANSISTOR, 2N7002T1, N-CHAN ENHAN MODE	Q2
☆ 485535	TRANSISTOR, IRFD9020, P-CHANNEL, MOSFET	Q1
488805	IC, LM393M, DUAL VOLTAGE COMP, L PWR	IC3
515085	FUSE WITH FUSEHOLDER, 2A, 125V, SLO-BLO	F302

D2725-01 ASSEMBLY		
PN	DESCRIPTION	REF DES
D2725-03	SCHEMATIC, POWER SUPPLY BD, 515B & 515C	~
A2725-04	TEST PROCEDURE, POWER SUPPLY BD, 515B & 515C	~
D2725-17	POWER SUPPLY BD, SUBASSY, 515B & 515C	~

NOTES:

1. D2725-17: COMPONENTS NOT FITTED - R15, D3, IC2, F301 & P102.
2. D2725-01: FOR TEST PROCEDURE SEE A2725-04.

DRAWING TABULATION		
DWG NO.	TITLE	NEXT ASSY
D2725-17	POWER SUPPLY BD SUBASSY, MODEL 515B & 515C	D2725-01
D2725-01	POWER SUPPLY BD ASSY, MODEL 515B & 515C	D6487-01

REV	R NO.	DATE
00	N372	29Sep95

DO NOT SCALE. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES. TOLERANCES: DEC X ± ~ (mm), FRAC ± ~ (mm), HOLES ± .007 -.003 (mm) (+.18 -.08), ANG ± ~. MATERIAL ~. FINISH ~.

TITLE: POWER SUPPLY BOARD ASSY, MODEL 515B & 515C

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

DRAWN RDG 11Aug95 | CHECKED BL 7Nov95 | MFG ENGR DH 11-7-95 | APPROVED AJE 7Nov95

USED ON: SEE TABULATION

SIZE	DRAWING NO.	CODE	REV
D	2725	17 01	00

SCALE: 2/1 | SHEET 1 OF 1

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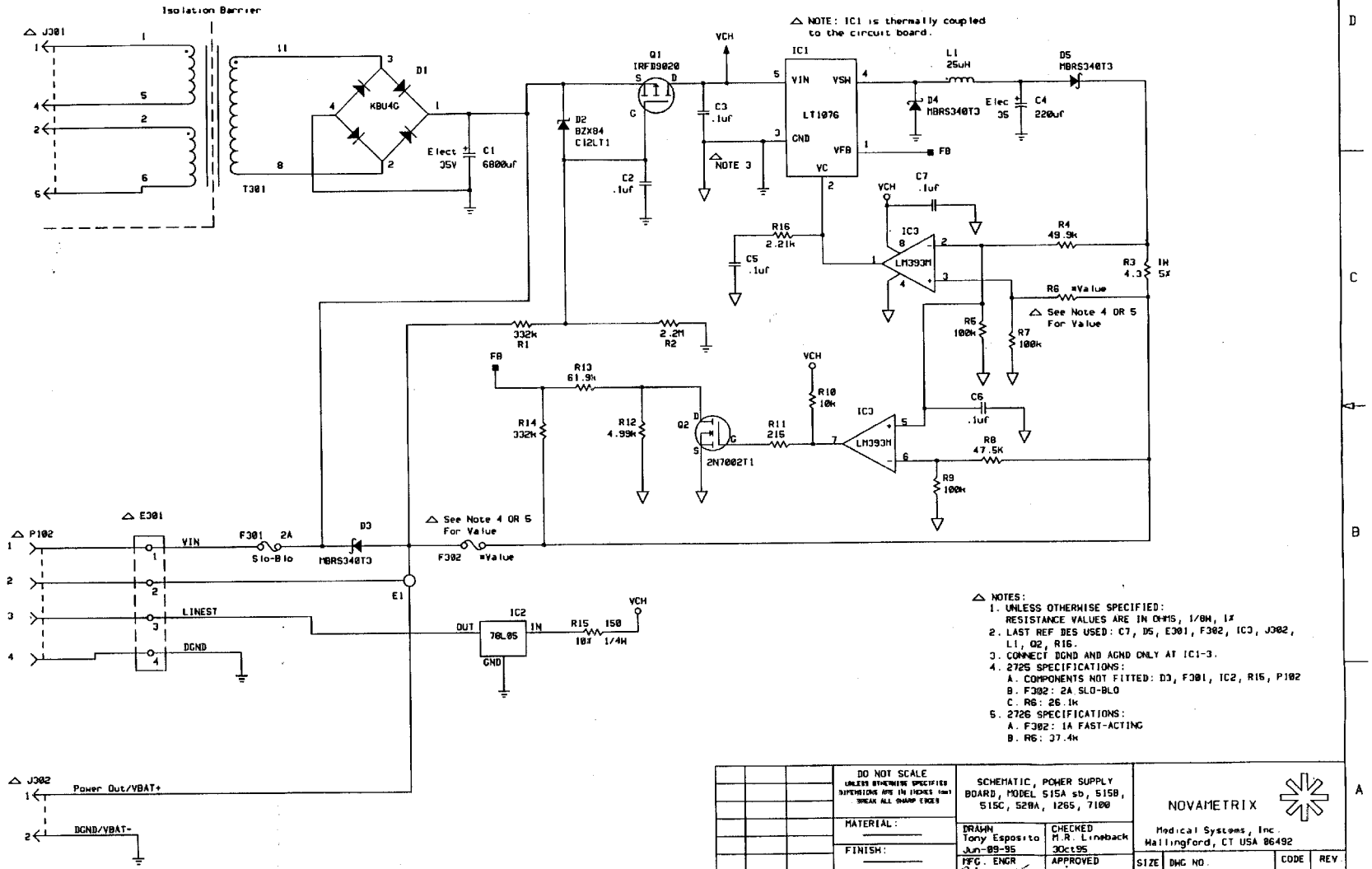

△ NOTES:
1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, 1/8W, 1%
2. LAST REF DES USED: C7, D5, E301, F302, IC3, J302, L1, Q2, R16.
3. CONNECT DGND AND AGND ONLY AT IC1-3.
4. 2725 SPECIFICATIONS:
   A. COMPONENTS NOT FITTED: D3, F301, IC2, R15, P102
   B. F302: 2A SLO-BLO
   C. R6: 26.1k
5. 2726 SPECIFICATIONS:
   A. F302: 1A FAST-ACTING
   B. R6: 37.4k

REV.	ECR NO.	BY	DATE
00	N372		30Oct95

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES

MATERIAL:

FINISH:

FILE: 2725-260300
DATE: 7-Nov-95
TIME: 10:20:23

SCHEMATIC, POWER SUPPLY BOARD, MODEL 515A sb, 515B, 515C, 520A, 1265, 7100

DRAWN	CHECKED
Tony Esposito Jun-09-95	M.R. Lineback 30Oct95
MFG. ENGR	APPROVED

USED ON D2726-01 & D2726-01

NOVAMETRIX
Medical Systems, Inc.
Wallingford, CT USA 06492

SIZE	DWG NO.	CODE	REV
D	2725 & 2726	03	00

SCALE: NONE SHEET 1 OF 1

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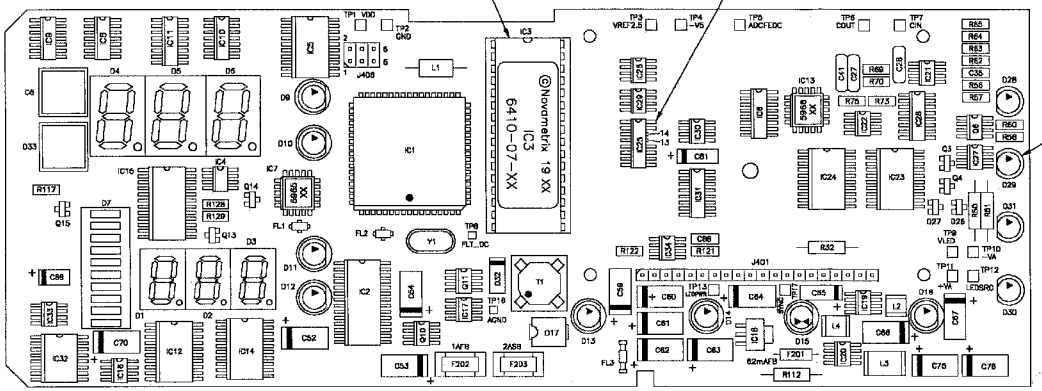
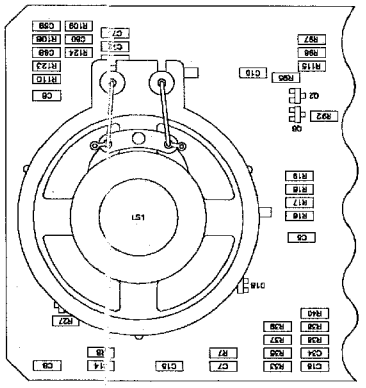
IC3 IS PART OF D2721-01

CUT PINS IC25-13 AND IC25-14

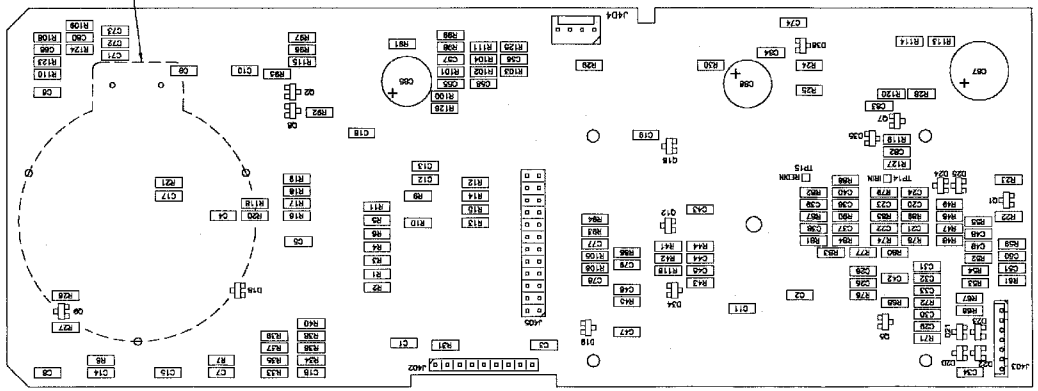
D28-D31 TO BE FLUSH WITH BOARD





DETAIL A

SEE DETAIL A FOR SPEAKER ASSY



NOTES:

1. D2721-17 SPECIFICATIONS: COMPONENTS NOT FITTED - D36, LCD1.
2. D2721-01: FOR TEST PROCEDURE SEE A2721-04.

DRAWING TABULATION

DWG NO.	TITLE	NEXT ASSY
D2721-17	MAIN BOARD SUBASSY, MODEL 515B & 515C	D2721/22-01
D2721-01	MAIN BOARD ASSY, MODEL 515B	D6500-01

REV	R NO.	DATE
01	N383	22May95

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm)
BREAK ALL SHARP EDGES
TOLERANCES
DEC ± ~ (mm ~)
FRAC ± ~ (mm ~)
HOLES +.007 -.003 (mm ~)
ANG ± ~
MATERIAL ~
FINISH ~

TITLE: MAIN BOARD ASSY, MODEL 515B

DRAWN RGG 19feb95 | CHECKED MRL 7Apr95
MFG ENGR EH 4-10-95 | APPROVED AJE 4/7/95
USED ON: SEE TABULATION

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO.	CODE	REV
D	2721	17 01	01

SCALE: 2/1 | SHEET 1 OF 2

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D2721-01 ASSEMBLY

PN	DESCRIPTION	REF DES
D2721-03	SCHEMATIC, MAIN BOARD, MODEL 515B	~
A2721-04	TEST PROCEDURE, MAIN BOARD, MODEL 515B	~
D2721-17	MAIN BOARD SUBASSY, MODEL 515B & 515C	~
A8410-07	PROGRAM, EPROM ASSY, Sp02, 515B & 515C	IC3

D2721-17 SUBASSEMBLY

PN	DESCRIPTION	REF DES
2721-02	FAB, MAIN BOARD, MODEL 515B AND 515C	~
A5965-07	PROGRAM, PEEL ASSY, CSIO CONTROLLER	IC7
A5966-07	PROGRAM, PEEL ASSY, TIMING SEQUENCER	IC13
☆130014	SPEAKER, 550 Hz, .5W, 2 IN. DIA	LS1
152066	CAPACITOR, 220uF, 63V, ELECTROLYTIC	C85
152070	CAPACITOR, 1000uF, 10V, ELECTROLYTIC	C86
152086	CAPACITOR, 1000uF, 16V, ELECTROLYTIC	C87
153058	CAPACITOR, 4700pF, 50V, 10%, X7R	C56
154062	CAPACITOR, .01uF, 50V, 10%, X7R	C71, C72, C82
☆154065	CAPACITOR, .1uF, 63V	C27, C28, C41
154072	CAPACITOR, .11uF, 50V, 10%, X7R	C1–C11, C14–C26, C29–C33, C36–C40, C42–C51, C55, C57, C88, C73, C74, C77, C78–C80, C83, C84, C88
154074	CAPACITOR, 1.5uF, 25V, 10%, TANT	C89
154079	CAPACITOR, 10uF, 16V, 10%, TANTALUM	C52, C65, C70, C81
154080	CAPACITOR, 47uF, 10VDC, 10%, TANTALUM	C64, C75, C76
154082	CAPACITOR, 22pF, 100V, 10%, NPO	C12, C13
154084	CAPACITOR, 2700pF, 100V, 10%, X7R	C58
154085	CAPACITOR, 47pF, 100V, 5%	C34, C35
154093	CAPACITOR, 68uF, 16V, 10%, TANTALUM	C59–C63
154094	CAPACITOR, 47uF, 20V, 20%, TANTALUM	C53, C54, C66, C67
☆180011	FERRITE BEAD, 22AWG TCW WIRE THRU CORE	L1
180019	INDUCTOR, 100uH, 10%	L3
180021	INDUCTOR, 20uH PARALLEL/80uH SERIES	T1
180022	INDUCTOR, 10uH, 10%	L2, L4
180029	INDUCTOR, 50MHZ CUT-OFF FREQUENCY	FL1, FL2
180030	INDUCTOR-CMP, 4700pF, 50V, 2A, 3 TERM	FL3
☆211414	CONNECTOR, 4 PIN, PLUG, FRICTION LOCK	J404
☆211634	CONNECTOR, 6 PIN, HEADER, DUAL ROW	J406
☆211721	CONNECTOR, 7 PIN, HEADER	J403
☆211914	CONNECTOR, 9 PIN, HEADER	J402
☆212534	CONNECTOR, 20 PIN, RECEPTACLE	J401
☆212609	CONNECTOR, 24 PIN, HEADER	J405
☆215059	SOCKET, 32 PIN, LOW PROFILE	FOR IC3
☆215074	SOCKET, 4 PIN, SINGLE-IN-LINE	FOR D8, D33
☆215075	SOCKET, 5 PIN, SINGLE-IN-LINE	FOR D1-D3
☆215078	SOCKET, 10 PIN, SINGLE-IN-LINE	FOR D7
☆215077	SOCKET, 15 PIN, SINGLE-IN-LINE	FOR D4-D6
☆230023	CRYSTAL, 12.288 MHZ, HC49S CASE	Y1
280222	SPACER, LED, FOR 3 LEADS, .25 DIA X .31 L	FOR D9-D16
☆470011	RESISTOR, 8.2 OHM, 1/4W, 10%	R32
☆472198	RESISTOR, 3.3 OHM, 1/4W, 1%	R50
☆472200	RESISTOR, 5.6 OHM, 1/4W, 1%	R51
☆472274	RESISTOR, 26.7 OHM, 1/4W, 1%	R112
474136	RESISTOR, 1k OHM, 1/8W, 1%	R100, R128, R128
474138	RESISTOR, 100 OHM, 1/8W, 1%	R22, R23, R25, R43, R44, R63, R64, R68, R69, R76, R77, R95, R117
474144	RESISTOR, 20.5k OHM, 1/8W, 1%	R74, R84, R104–R108, R120
474145	RESISTOR, 215 OHM, 1/8W, 1%	R29, R30, R53, R56, R110, R116
474148	RESISTOR, 2.05k OHM, 1/8W, 1%	R111, R121, R125
474149	RESISTOR, 33.2k OHM, 1/8W, 1%	R21, R99
474153	RESISTOR, 42.2k OHM, 1/8W, 1%	R58–R61, R66, R67, R80, R83, R113–R115
474157	RESISTOR, 511 OHM, 1/8W, 1%	R96, R109
474160	RESISTOR, 5.11k OHM, 1/8W, 1%	R20
474165	RESISTOR, 10k OHM, 1/8W, 1%	R16–R19, R46, R48, R79, R82, R116, R119, R122
474166	RESISTOR, 100k OHM, 1/8W, 1%	R1–R15, R33–R41, R54, R57, R62, R65, R70, R86, R91–R94, R97, R123, R124, R129
474172	RESISTOR, 10 OHM, 1/8W, 1%	R26, R27, R45, R52, R55, R71, R72, R85, R87 R89, R90, R108
474175	RESISTOR, 3.92k OHM, 1/8W, 1%	R73, R75, R88
474178	RESISTOR, 825 OHM, 1/8W, 1%	R28
474182	RESISTOR, 150k OHM, 1/8W, 1%	R101
474185	RESISTOR, 150 OHM, 1/8W, 1%	R24
474186	RESISTOR, 15k OHM, 1/8W, 1%	R78, R81, R102, R103
474209	RESISTOR, 2.67k OHM, 1/8W, 1%	R31, R47 R49, R127
474210	RESISTOR, 56.2k OHM, 1/8W, 1%	R98
474211	RESISTOR, 49.9k OHM, 1/8W, 1%	R42
475045	E2 POTENTIOMETER, 10k OHM, 20%	IC33, IC34
481546	DIODE, MMBD914L, SWITCHING	D20–D27, D34, D35
481547	DIODE, MMBD3011L, HOT CARRIER, SCHOTTKY	D18, D19
481549	DIODE, MBRS140T3, RECTIFIER	D32
481552	DIODE, MBRS340T3, SCHOTTKY, 40V, 3A	D17
☆482586	LED, HLMP-C100, RED, .100 SPACING, PC MOUNT	D28–D31
☆482586	LED LIGHT BAR, YELLOW, .36 X .55	D8
☆482587	LED LIGHT BAR, RED, .35 X .35	D33
☆482588	LED BAR GRAPH, 10 GRAPH, 10 ELEMENT, RED	D7
☆482589	LED 7 SEG DISPLAY, 10mm, BLK SURFACE, RED	D1–D3
☆482590	LED 7 SEG DISPLAY, 14.2mm, BLK SURF, RED	D4–D6
☆482591	LED, YELLOW	D13, D14
☆482592	LED, GREEN	D16
☆482593	LED, RED	D9–D12
☆482594	LED, BICOLOR, RED & GREEN, 3 LEAD	D15
483018	TRANSISTOR, MMBT3906T, PNP	Q12, Q16
484080	TRANSISTOR, MMBT3904T, NPN	Q7
485532	TRANSISTOR, 2N7002T1, N-CHAN ENHAN MODE	Q1, Q2, Q5, Q8, Q9, Q13-Q15
485540	TRANSISTOR, SI9955DY, DUAL MOSFET, N-CHAN	Q6
485548	TRANSISTOR, VN0605T, N-CHAN ENHAN MODE	Q3, Q4
485547	TRANSISTOR, TPS1101D, MOSFET, P-CHAN ENHAN	Q10, Q11
484541	VOLTAGE REGULATOR, LM317LD, +1.2V TO +37V	IC20
484553	TL5001CD, PULSE WIDTH MOD CONT, 8 PIN	IC17
484554	VOLTAGE REGULATOR, LT1054CS8, SW CAP.	IC19
484557	VOLTAGE REGULATOR, LT1117CST-5, POS, 3 PIN	IC18
486041	IC, MAX7219CWG, DISPLAY DRIVER, 8 DIGIT	IC15
486306	IC, MCM60L256AF10, 32K X 8 CMOS SRAM	IC2
486319	IC, MC14020BD, 14-BIT BINARY COUNTER	IC6
486320	IC, SN74HC14D, HEX SCHMITT-TRIGGER INV	IC10
486321	IC, SN74HC138D, 3-LINE TO 8-LINE DECODER	IC11
486323	IC, SN74HC573DW, OCTAL D-TYPE LATCH	IC5, IC12, IC14
486324	IC, DG444DY, QUAD SPST CMOS ANALOG SW	IC28
486329	IC, SN74HC32D, QUAD 2-IN. POS OR GATE	IC8, IC9
486332	IC, AD7703BR, 20-BIT A TO D CONVERTER	IC23, IC24
486333	IC, HD6418CRCP-6X, 8-BIT MPU	IC1
486334	IC, MC14051BD, 8-CH ANALOG MUX/DEMUX	IC25
486342	IC, PCD3311C1DS, MUSICAL-TONE GEN	IC32
486790	IC, TLE2022CD, DUAL H SPEED L PWR OP AMP	IC27
486794	IC, PM7524FS, 8-BIT D TO A CONVERTER	IC31
486795	IC, TLC549ID, 8-BIT A TO D CONVERTER	IC26
486812	IC, AD780AR, 2.5 VOLTAGE REFERENCE	IC29
487084	IC, OP-282GS, DUAL JFET OP AMP, LOW PWR	IC21, IC22, IC30
487098	IC, MAX705CSA, UPROCESSOR SUPERVISORY CKT	IC4
487114	IC, MC34119D, AUDIO AMPLIFIER, L POWER	IC15
☆515074	FUSE, 1/16A, 125V, VERY FAST-ACTING	F201
515083	FUSE WITH FUSEHOLDER, 1A, 125V, FAST-BLO	F202
515085	FUSE WITH FUSEHOLDER, 2A, 125V, SLO-BLO	F203

NOTES:

☆ DENOTES THRU HOLE COMPONENTS.

DRAWING TABULATION

DWG NO.	TITLE	NEXT ASSY
D2721-17	MAIN BOARD SUBASSY, MODEL 515B & 515C	D2721/22-01
D2721-01	MAIN BOARD ASSY, MODEL 515B	D6500-01

REV	R NO.	DATE
01	N363	22May95

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm)
BREAK ALL SHARP EDGES
TOLERANCES
DEC ± .~ (mm) (± .~)
FRAC ± .~ (mm) (± .~)
HOLES +.007 -.003 (mm) (± .~)
ANG ± ~
MATERIAL ~
FINISH ~

TITLE: MAIN BOARD ASSY, MODEL 515B

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

DRAWN	CHECKED
RGO 1Feb95	MRL 7Apr95
MFG ENGR	APPROVED
EH 4-10-95	AJE 4/7/95

USED ON: SEE TABULATION

SIZE	DRAWING NO.	CODE	REV
D	2721	17 01	01

SCALE: NONE SHEET 2 OF 2

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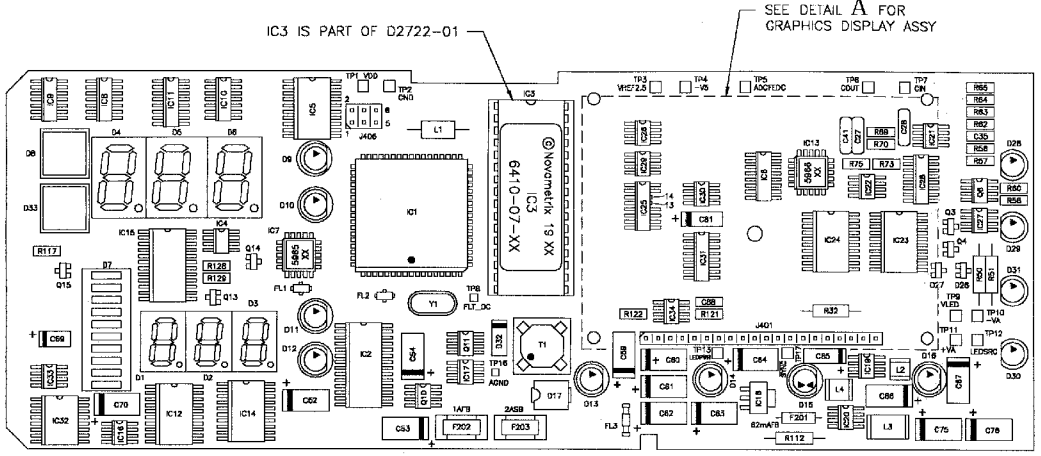
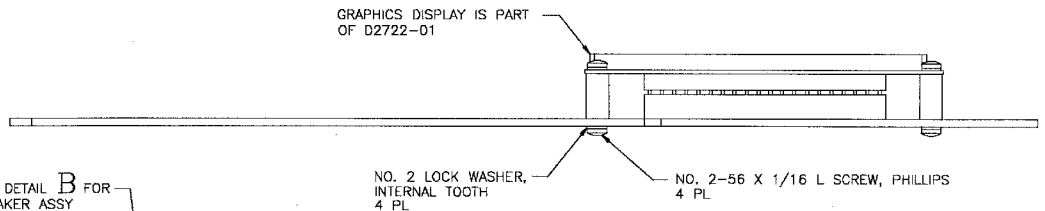
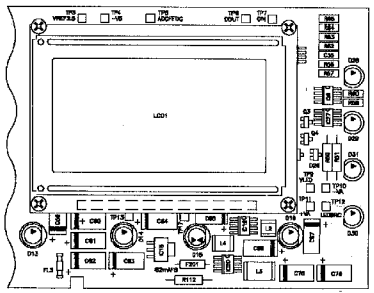
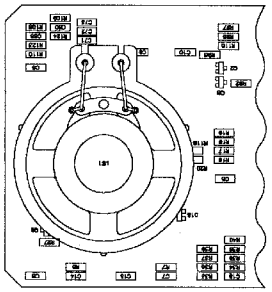
D2722-01 ASSEMBLY		
PN	DESCRIPTION	REF DES
D2722-03	SCHEMATIC, MAIN BOARD, MODEL 515C	~
A2722-04	TEST PROCEDURE, MAIN BOARD, MODEL 515C	~
D2721-17	MAIN BOARD SUBASSY, MODEL 515B & 515C	~
B6406-01	GRAPHICS DISPLAY ASSY, MODEL 515C	LCD1
A6410-07	PROGRAM, EPROM ASSY, SpO2, 515B & 515C	IC3
281204	SCREW, 2-56 X 3/16 L, PHILLIPS	FOR B6406-01
285012	LOCK WASHER, NO. 2, INTERNAL TOOTH, STEEL	FOR B6406-01



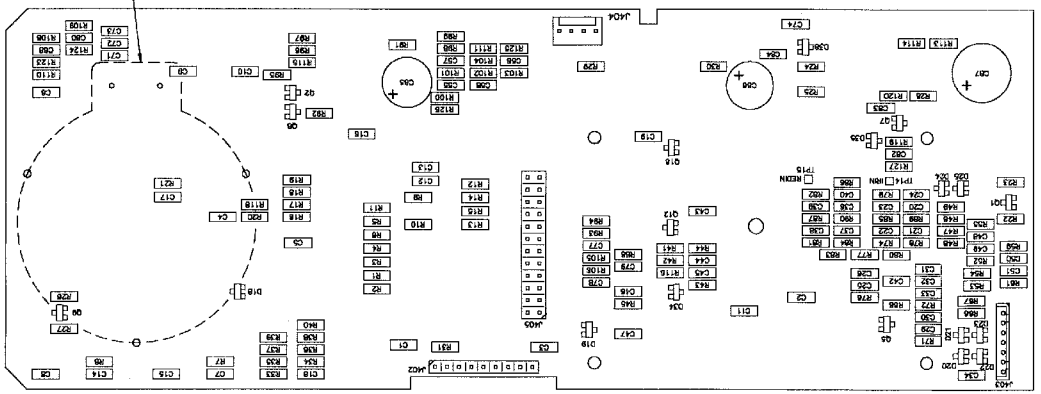




DETAIL A
SCALE: NONE



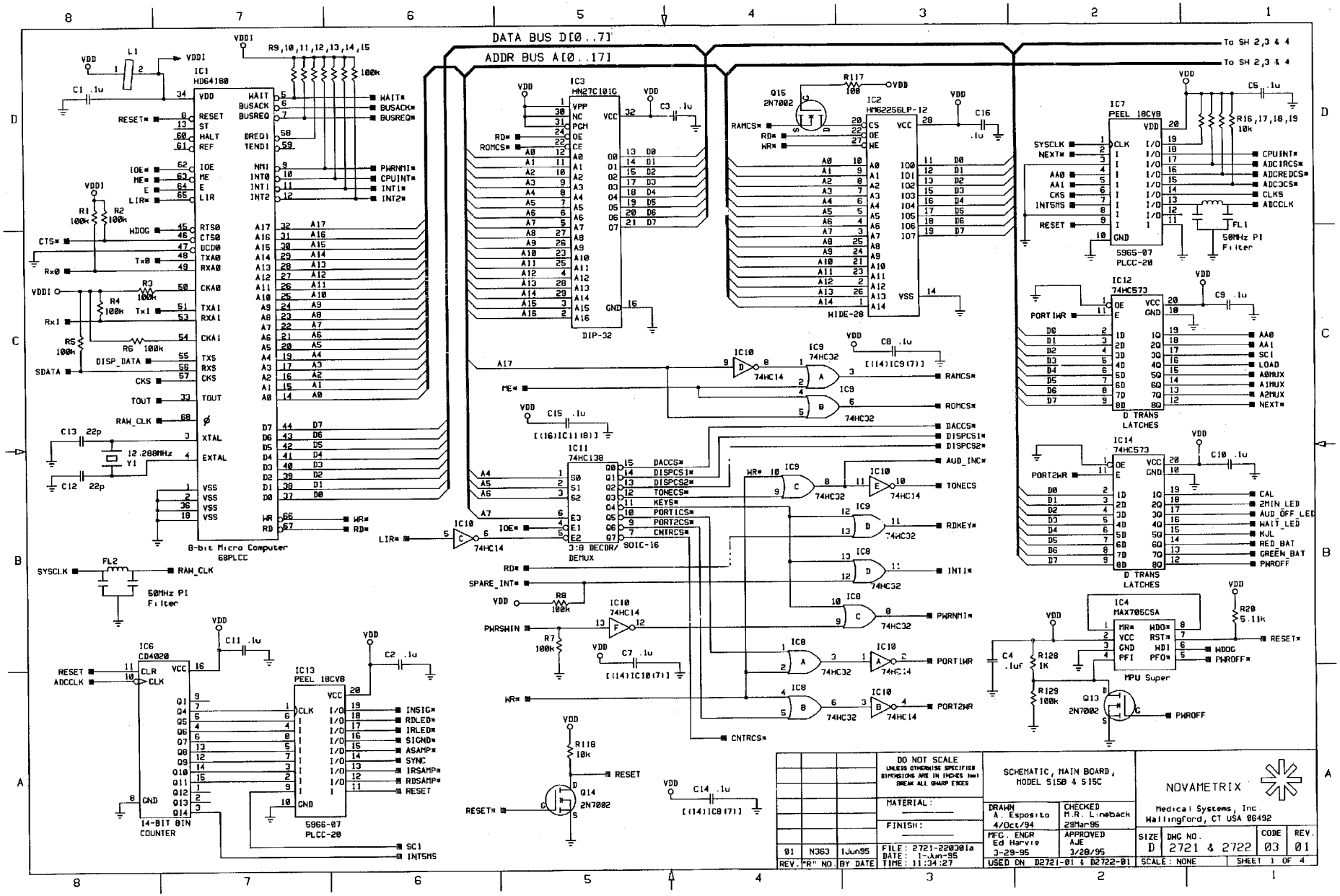
DETAIL B
SCALE: NONE

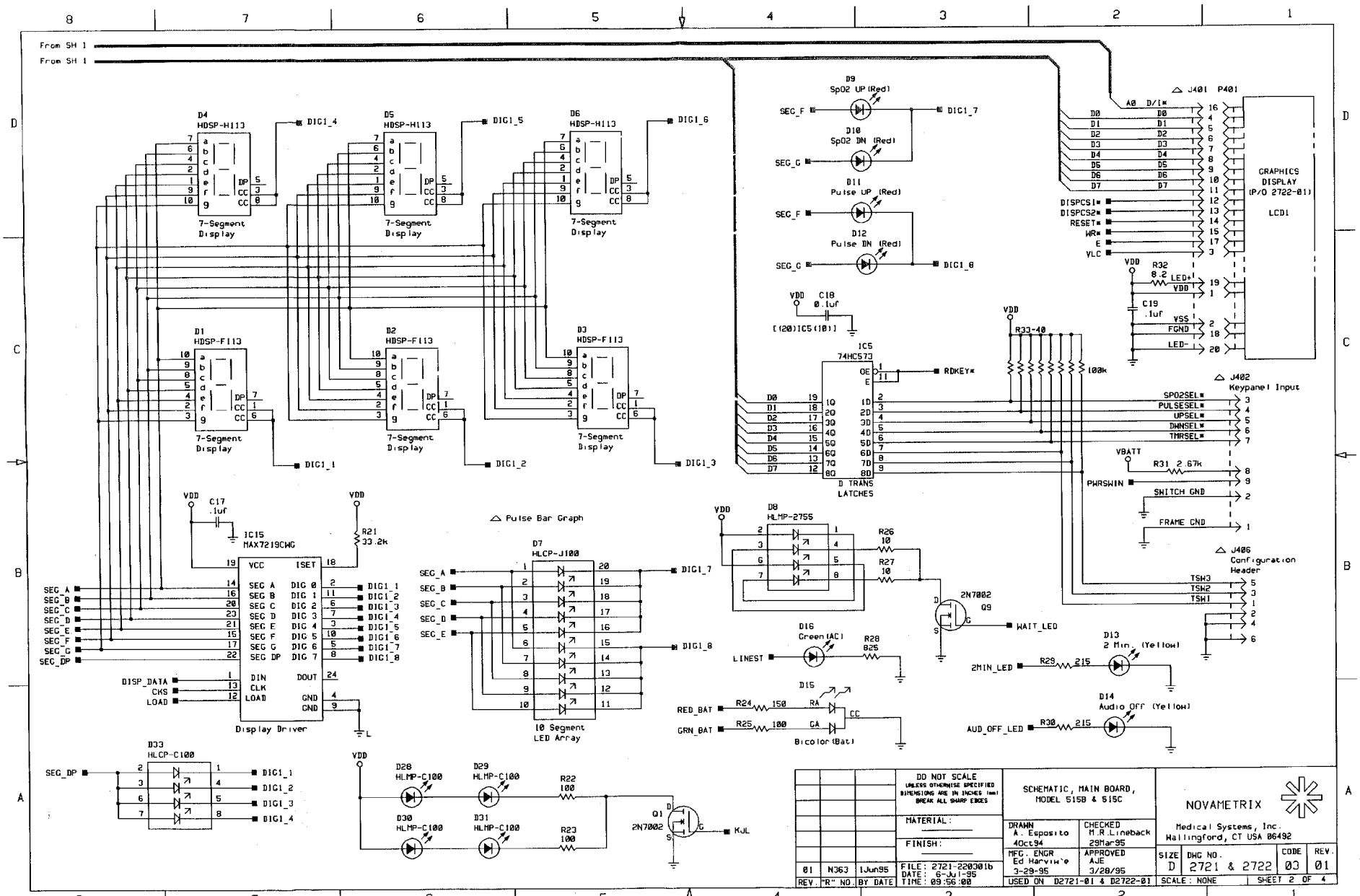


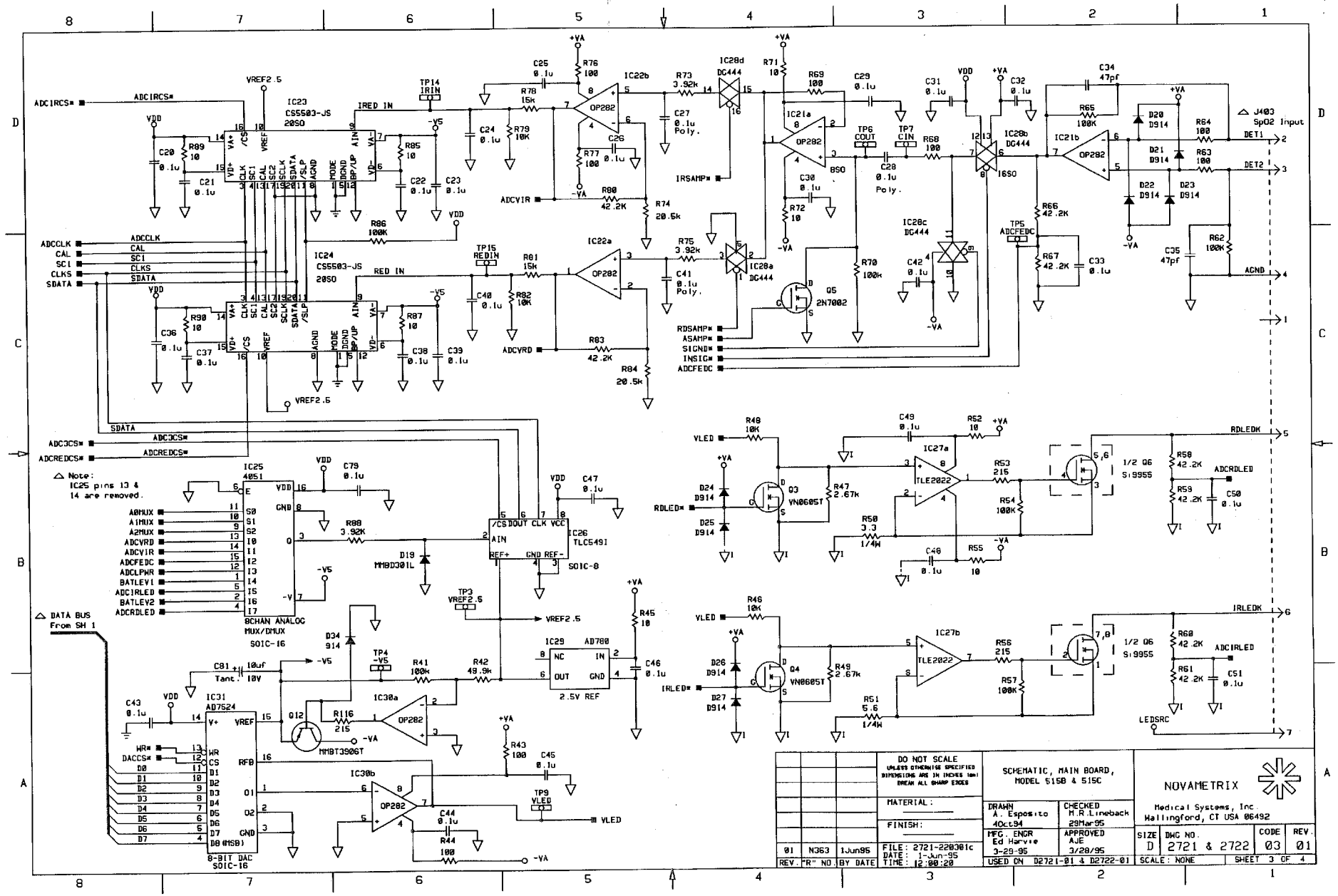
NOTES:

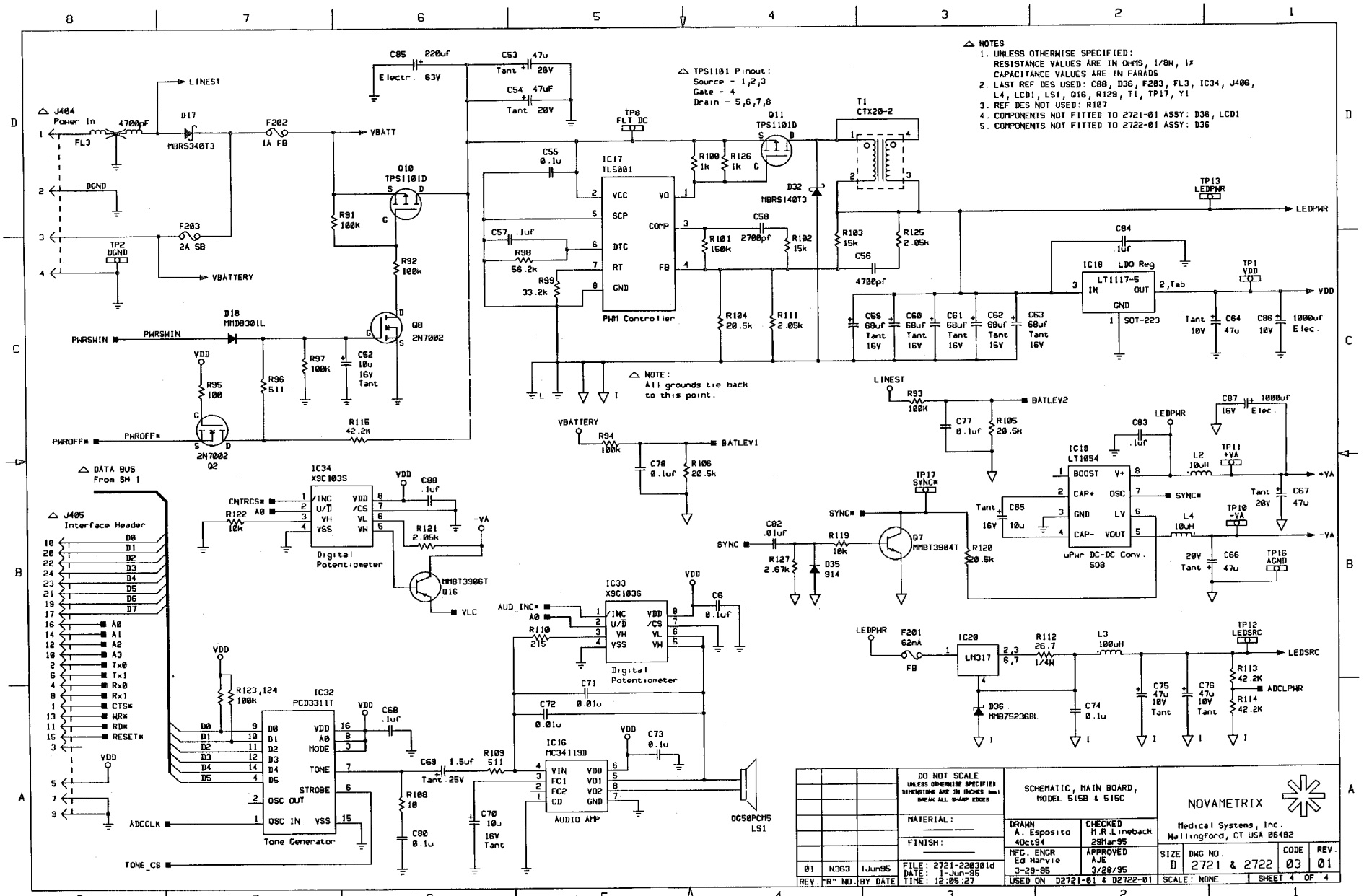
1. THE FOLLOWING COMPONENT IS NOT FITTED TO D2721-17: D36.
2. D2722-01: FOR TEST PROCEDURE SEE A2722-04.
3. PERMANENTLY MARK ASSEMBLY NUMBER "2722-01-XX" WITH CURRENT REVISION NUMBER.

			DO NOT SCALE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES TOLERANCES DEC ± ~ (mm) ± ~ FRAC ± ~ (mm) ± ~ HOLES +.007 -.003 (mm) ± ~ ANG ± ~	TITLE MAIN BOARD ASSY, MODEL 515C	NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492		
			MATERIAL ~	DRAWN BGG 19Feb95	CHECKED MRL 7Apr95	SIZE D	DRAWING NO. 2722	CODE 01	REV 01
				MFG ENGR EH 4-10-95	APPROVED AJE 4/7/95				
01	N383	24May95	FINISH ~	USED ON: B6650-01		SCALE: 2/1		SHEET 1 OF 1	
REV	R NO.	DATE							


DATA BUS D[0..7]
ADDR BUS A[0..17]
To SH 2,3 & 4
To SH 2,3 & 4
IC1 HD64180
8-bit Micro Computer 68PLCC
IC3 HN27C101G
DIP-32
IC2 HM62256LP-12
WIDE-28
IC7 PEEL 18CV8
5965-07 PLCC-20
IC12 74HC573
D TRANS LATCHES
IC14 74HC573
D TRANS LATCHES
IC11 74HC138
3:8 DECDR/ DEMUX SOIC-16
IC4 MAX705CSA
MPU Super
IC6 CD4020
14-BIT BIN COUNTER
IC13 PEEL 18CV8
5966-07 PLCC-20
50MHz PI Filter
50MHz PI Filter
12.288MHz
DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] BREAK ALL SHARP EDGES
MATERIAL:
FINISH:
SCHEMATIC, MAIN BOARD, MODEL 515B & 515C
DRAWN A. Esposito 4/Oct/94
CHECKED M.R. Lineback 28Mar95
MFG. ENGR Ed Harvie 3-29-95
APPROVED AJE 3/28/95
NOVAMETRIX
Medical Systems, Inc.
Hallingford, CT USA 06492
SIZE D
DWG NO. 2721 & 2722
CODE 03
REV. 01
SCALE: NONE
SHEET 1 OF 4
USED ON D2721-01 & D2722-01
01 N363 10Jun95
FILE: 2721-220301a
DATE: 1-Jun-95
TIME: 11:34:27


From SH 1
From SH 1
D4 HDSP-H113
D5 HDSP-H113
D6 HDSP-H113
7-Segment Display
DIG1_4
DIG1_5
DIG1_6
D1 HDSP-F113
D2 HDSP-F113
D3 HDSP-F113
DIG1_1
DIG1_2
DIG1_3
D9 SpO2 UP (Red)
D10 SpO2 DN (Red)
D11 Pulse UP (Red)
D12 Pulse DN (Red)
SEG_F
SEG_G
DIG1_7
DIG1_8
J401 P401
GRAPHICS DISPLAY (P/O 2722-01)
LCD1
R32 8.2
C18 0.1uf
C19 .1uf
IC5 74HC573
D TRANS LATCHES
RDKEY*
R33-40 100k
J402 Keypanel Input
SPO2SEL*
PULSESEL*
UPSEL*
DWNSEL*
TMRSEL*
PWRSWIN
R31 2.67k
SWITCH GND
FRAME GND
J406 Configuration Header
TSW3
TSW2
TSW1
C17 .1uf
IC15 MAX7219CWG
R21 33.2k
Display Driver
DISP_DATA
CKS
LOAD
Pulse Bar Graph
D7 HLCP-J100
10 Segment LED Array
D8 HLMP-2755
R26 10
R27 10
Q9 2N7002
WAIT_LED
D16 Green(AC)
R28 825
LINEST
D13 2 Min. (Yellow)
2MIN_LED
R29 215
D15
R24 150
R25 100
RED_BAT
GRN_BAT
Bicolor(Bat)
D14 Audio Off (Yellow)
AUD_OFF_LED
R30 215
D33 HLCP-C100
D28 HLMP-C100
D29 HLMP-C100
D30 HLMP-C100
D31 HLMP-C100
R22 100
R23 100
Q1 2N7002
KJL
DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] BREAK ALL SHARP EDGES
MATERIAL:
FINISH:
SCHEMATIC, MAIN BOARD, MODEL 515B & 515C
DRAWN A. Esposito 4Oct94
CHECKED M.R.Lineback 29Mar95
MFG. ENGR Ed Harvie 3-29-95
APPROVED AJE 3/29/95
USED ON D2721-01 & D2722-01
NOVAMETRIX
Medical Systems, Inc.
Hallingford, CT USA 06492
SIZE D
DWG NO. 2721 & 2722
CODE 03
REV. 01
SCALE: NONE
SHEET 2 OF 4
01 N363 1Jun95
REV. "R" NO. BY DATE
FILE: 2721-220301b
DATE: 6-Jul-95
TIME: 09:56:00


ADCIRCS*
IC23 CS5503-JS 20SO
IRED IN
TP14 IRIN
IC22b OP282
R73 3.92k
IC28d DG444
R71 10
IRSAMP*
ADCVIR
R80 42.2K
R74 20.5k
R86 100K
ADCCLK
CAL
SCI
CLKS
SDATA
IC24 CS5503-JS 20SO
RED IN
TP15 REDIN
IC22a OP282
R75 3.92k
IC28a DG444
RDSAMP*
ASAMP*
SIGND*
INSIG*
ADCFEDC
Q5 2N7002
R82 10K
ADCVRD
R83 42.2K
R84 20.5k
SDATA
ADC3CS*
ADCREDCS*
IC25 4051
8CHAN ANALOG MUX/DMUX SOIC-16
A0MUX
A1MUX
A2MUX
ADCVRD
ADCVIR
ADCFEDC
ADCLPWR
BATLEV1
ADCIRLED
BATLEV2
ADCRDLED
IC26 TLC5491 SOIC-8
D19 MMBD301L
R88 3.92K
TP2 VREF2.5
VREF2.5
IC29 AD780 2.5V REF
R45 10
C46 0.1u
C81 10uf Tant. 10V
D34 914
TP4 -V5
R41 100K
R42 49.9K
IC30a OP282
Q12 MMBT3906T
R116 215
IC31 AD7524 8-BIT DAC SOIC-16
WR*
DACCS*
D0
D1
D2
D3
D4
D5
D6
D7
D8 (MSB)
IC30b OP282
R43 100
C45 0.1u
TP9 VLED
R44 100
C44 0.1u
VLED
R48 10K
Q3 VN0605T
R47 2.67K
D24 D914
D25 D914
RDLED*
IC27a TLE2022
R53 215
R54 100K
R50 3.3 1/4W
R55 10
C48 0.1u
C49 0.1u
R52 10
1/2 Q6 Si9955
R58 42.2K
R59 42.2K
C50 0.1u
ADCRDLED
RDLEDK
Q4 VN0605T
R49 2.67K
D26 D914
D27 D914
IRLED*
IC27b TLE2022
R56 215
R57 100K
R51 5.6 1/4W
R60 42.2K
R61 42.2K
C51 0.1u
ADCIRLED
IRLEDK
LEDSRC
IC28b DG444
IC28c DG444
TP6 COUT
TP7 CIN
TP5 ADCFEDC
C27 0.1u Poly.
C28 0.1u Poly.
C41 0.1u Poly.
R66 42.2K
R67 42.2K
C33 0.1u
R70 100K
C42 0.1u
C34 47pf
C35 47pf
R62 100K
R65 100K
R64 100
R63 100
D20 D914
D21 D914
D22 D914
D23 D914
J403 Sp02 Input
DET1
DET2
AGND
DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES tol BREAK ALL SHARP EDGES
MATERIAL :
FINISH :
SCHEMATIC, MAIN BOARD, MODEL 515B & 515C
DRAWN A. Esposito 40ct94
CHECKED M.R.Lineback 29Mar95
MFG. ENGR Ed Harvie 3-29-95
APPROVED AJE 3/29/95
USED ON D2721-01 & D2722-01
NOVAMETRIX
Medical Systems, Inc.
Wallingford, CT USA 06492
SIZE D
DWG NO. 2721 & 2722
CODE 03
REV. 01
SCALE : NONE
SHEET 3 OF 4
01 N363 1Jun95
FILE : 2721-220301c
DATE : 1-Jun-95
TIME : 12:00:20


NOTES
1. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS, 1/8W, 1%
CAPACITANCE VALUES ARE IN FARADS
2. LAST REF DES USED: C88, D36, F203, FL3, IC34, J406, L4, LCD1, LS1, Q16, R129, T1, TP17, Y1
3. REF DES NOT USED: R107
4. COMPONENTS NOT FITTED TO 2721-01 ASSY: D36, LCD1
5. COMPONENTS NOT FITTED TO 2722-01 ASSY: D36
TPS1101 Pinout:
Source - 1,2,3
Gate - 4
Drain - 5,6,7,8
NOTE:
All grounds tie back to this point.
DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES BREAK ALL SHARP EDGES
MATERIAL:
FINISH:
SCHEMATIC, MAIN BOARD, MODEL 515B & 515C
DRAWN A. Esposito 40ct94
CHECKED M.R.Lineback 29Mar95
MFG. ENGR Ed Harvie 3-29-95
APPROVED AJE 3/28/95
USED ON D2721-01 & D2722-01
FILE: 2721-220301d
DATE: 1-Jun-95
TIME: 12:05:27
01 N363 1Jun95
REV. "R" NO. BY DATE
NOVAMETRIX
Medical Systems, Inc.
Wallingford, CT USA 06492
SIZE D
DWG NO. 2721 & 2722
CODE 03
REV. 01
SCALE: NONE
SHEET 4 OF 4

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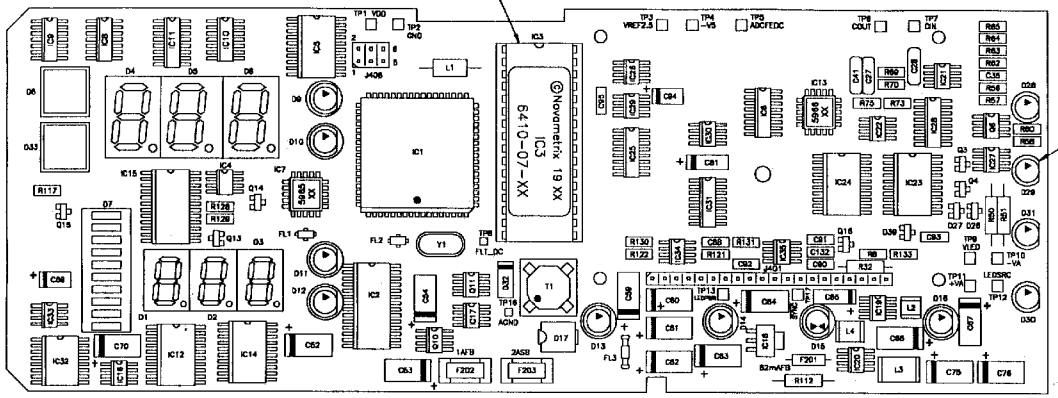
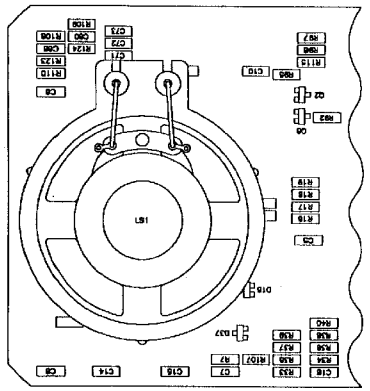
IC3 IS PART OF D2723-01

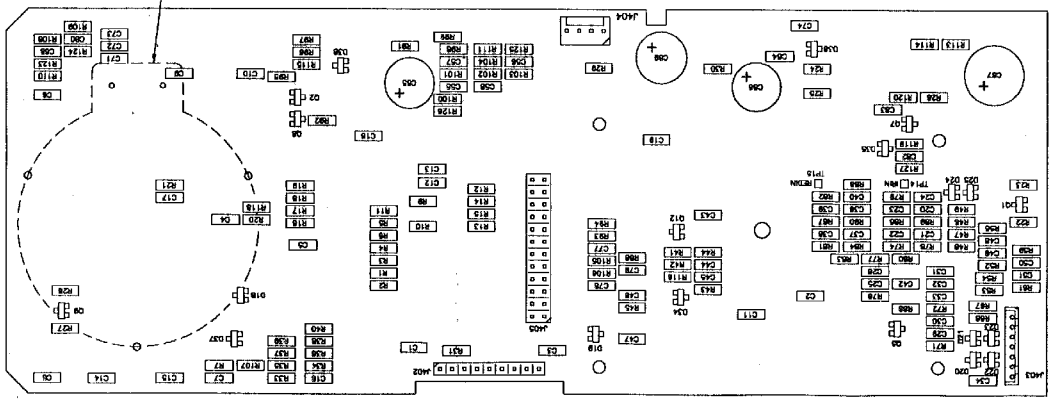


D28-D31 TO BE FLUSH WITH BOARD. REFER TO NOTE 1B FOR ORIENTATION.



DETAIL A

SPEAKER NOT SHOWN FOR CLARITY IN THIS VIEW. REFER TO DETAIL A FOR ASSEMBLED VIEW.



NOTES:

1. D2723-17 SPECIFICATIONS:
   A. COMPONENTS NOT FITTED: D36, LCD1, R32.
   B. WHEN MOUNTING D28-D31: IGNORE THE "FLAT" ON THE SILK-SCREEN CIRCLE. THE LONG LEAD IS THE ANODE SIDE & SHOULD BE INSERTED PER THE FLAT ON THE DIODE SYMBOL (▶).
2. D2723-01: FOR TEST PROCEDURE SEE A2723-04.

DRAWING TABULATION		
DWG NO.	TITLE	NEXT ASSY
D2723-17	MAIN BOARD SUBASSY, MODEL 515B & 515C	D2723/24-01
D2723-01	MAIN BOARD ASSY, MODEL 515B	D6500-01

REV	B NO.	DATE
01	N372	28Sep95

DO NOT SCALE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES TOLERANCES DEC ± .- FRAC ± .- HOLES +.007 -.003 (+.18 -.08) ANG ± .- MATERIAL ~ FINISH ~

TITLE: MAIN BOARD ASSY, MODEL 515B

DRAWN RDQ 25Jul95 | CHECKED MFL 26Aug95 | MFG ENGR CH 28Aug95 | APPROVED AJE 28Aug95

USED ON: SEE TABULATION

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO	CODE	REV
D	2723	17 01	01

SCALE: 2/1 | SHEET 1 OF 2

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D2723-01 ASSEMBLY

PN	DESCRIPTION	REF DES
D2723-03	SCHEMATIC, MAIN BOARD, MODEL 515B	~
A2723-04	TEST PROCEDURE, MAIN BOARD, MODEL 515B	~
D2723-17	MAIN BOARD SUBASSY, MODEL 515B & 515C	~
A8410-07	PROGRAM, EPROM ASSY, Sp02, 515B & 515C	IC3

D2723-17 SUBASSEMBLY

PN	DESCRIPTION	REF DES
2723-02	PAB, MAIN BOARD, MODEL 515B AND 515C	~
A5985-07	PROGRAM, PEEL ASSY, CSIO CONTROLLER	IC7
A5968-07	PROGRAM, PEEL ASSY, TIMING SEQUENCER	IC13
☆ 130014	SPEAKER, 550 Hz, .5W, 2 IN. DIA	LS1
☆ 152056	CAPACITOR, 220uF, 63V, ELECTROLYTIC	C85
☆ 152070	CAPACITOR, 1000uF, 10V, 20%, ELECTROLYTIC	C86
☆ 152084	CAPACITOR, 470uF, 25V, 20%, AL, ELECTROLYTIC	C89
☆ 152086	CAPACITOR, 1000uF, 16V, 20%, AL, ELCTLT	C87
153058	CAPACITOR, 4700pF, 50V, 10%, X7R, CERAMIC	C56
154062	CAPACITOR, .01uF, 50V, 10%, X7R	C71, C72, C82, C90
☆ 154065	CAPACITOR, .1uF, 63V, .2 SP, POLYESTER FILM	C27, C28, C41
154072	CAPACITOR, .1uF, 50V, 10%, X7R, CER CHIP	C1-C11, C14-C26, C29-C33, C38-C40, C42-C51, C55, C57, C58, C73, C74, C77-C80, C83, C84, C88, C91-C93
154074	CAPACITOR, 1.5uF, 25V, 10%, TANT	C69, C94
154079	CAPACITOR, 10uF, 16V, 10%, TANTALUM	C52, C65, C70, C81
154080	CAPACITOR, 47uF, 10VDC, 10%, TANTALUM	C64, C75, C76
154082	CAPACITOR, 22pF, 100V, 10%, NPO	C12, C13
154084	CAPACITOR, 2700pF, 100V, 10%, X7R	C58, C95
154085	CAPACITOR, 47pF, 100V, 5%, MLTILYR CERAMIC	C34, C35
154093	CAPACITOR, 68uF, 16V, 10%, TANTALUM	C59-C63
154095	CAPACITOR, 22uF, 20VDC, 10%, TANTALUM	C53, C54, C66, C67
☆ 180011	FERRITE BEAD, 22AWG TCW WIRE THRU CORE	L1
180019	INDUCTOR, 100uH, 10%	L3
180021	INDUCTOR, 20uH PARALLEL/80uH SERIES	T1
180022	INDUCTOR, 10uH, 10%	L2, L4
180029	INDUCTOR, 50MHZ CUT-OFF FREQUENCY	FL1, FL2
180030	INDUCTOR-GAP, 4700pF, 50V, 2A, 3 TERM	FL3
☆ 211414	CONNECTOR, 4 PIN, PLUG, FRICTION LOCK	J404
☆ 211634	CONNECTOR, 6 PIN, HEADER, DUAL ROW, .1 SP	J408
☆ 211721	CONNECTOR, 7 PIN, HEADER, .079 SPACING	J403
☆ 211914	CONNECTOR, 9 PIN, HEADER, SIL, .100 SP	J402
☆ 212534	CONNECTOR, 20 PIN, RECEPTACLE, SIL, .100 SP	J401
☆ 212609	CONNECTOR, 24 PIN, HEADER, .100 SPACING	J405
☆ 215059	SOCKET, 32 PIN, LOW PROFILE, .6 SPACING	FOR IC3
☆ 215074	SOCKET, 4 PIN, SINGLE-IN-LINE, .100 SP	FOR D8, D33
☆ 215075	SOCKET, 5 PIN, SINGLE-IN-LINE, .100 SP	FOR D1-D3
☆ 215076	SOCKET, 10 PIN, SINGLE-IN-LINE, .100 SP	FOR D7
☆ 215077	SOCKET, 15 PIN, SINGLE-IN-LINE, .100 SP	FOR D4-D6
☆ 230023	CRYSTAL, 12.288 MHz, HC49S CASE	Y1
280222	SPACER, LED, FOR 3 LEADS, .25 DIA X .31 L	FOR D9-D16

PN	DESCRIPTION	REF DES
☆ 472198	RESISTOR, 3.3 OHM, 1/4W, 1%	R50
☆ 472200	RESISTOR, 5.6 OHM, 1/4W, 1%	R51
☆ 472274	RESISTOR, 28.7 OHM, 1/4W, 1%	R112
474135	RESISTOR, 1k OHM, 1/8W, 1%	R6, R100, R126, R128
474138	RESISTOR, 100 OHM, 1/8W, 1%	R22, R23, R25, R31, R43, R44, R83, R64, R68, R69, R76, R77, R95, R117
474144	RESISTOR, 20.5k OHM, 1/8W, 1%	R104-R108, R120, R130
474145	RESISTOR, 215 OHM, 1/8W, 1%	R29, R30, R53, R58, R110, R116
474147	RESISTOR, 24.9k OHM, 1/8W, 1%	R131
474148	RESISTOR, 2.05k OHM, 1/8W, 1%	R111, R125
474149	RESISTOR, 33.2k OHM, 1/8W, 1%	R21, R97, R99
474153	RESISTOR, 42.2k OHM, 1/8W, 1%	R58, R61, R66, R67, R74, R80, R83, R84, R96, R113-R115
474157	RESISTOR, 511 OHM, 1/8W, 1%	R109
474160	RESISTOR, 5.11k OHM, 1/8W, 1%	R20
474165	RESISTOR, 10k OHM, 1/8W, 1%	R16-R19, R46, R48, R79, R82, R116, R119,
474168	RESISTOR, 100k OHM, 1/8W, 1%	R1-R7, R9-R15, R33-R41, R54, R57, R62, R65, R70, R86, R91, R93, R94, R123, R124, R129
474170	RESISTOR, 301k OHM, 1/8W, 1%	R92
474172	RESISTOR, 10 OHM, 1/8W, 1%	R26, R27, R45, R52, R55, R71, R72, R85, R87, R89, R90, R108
474175	RESISTOR, 3.92k OHM, 1/8W, 1%	R73, R75, R88
474178	RESISTOR, 825 OHM, 1/8W, 1%	R28
474182	RESISTOR, 150k OHM, 1/8W, 1%	R101, R132
474185	RESISTOR, 150 OHM, 1/8W, 1%	R24
474186	RESISTOR, 15k OHM, 1/8W, 1%	R78, R81, R102, R103, R122, R133
474209	RESISTOR, 2.67k OHM, 1/8W, 1%	R47 R49, R107, R127
474210	RESISTOR, 68.2k OHM, 1/8W, 1%	R98
474211	RESISTOR, 49.9k OHM, 1/8W, 1%	R42, R121
475045	E2 POTENTIOMETER, 10k OHM, 20%	IC33, IC34

PN	DESCRIPTION	REF DES
481546	DIODE, MMBD914L, SWITCHING	D20-D27, D34, D35, D37-D39
481547	DIODE, MMBD301L, HOT CARRIER SCHOTTKY	D18, D19
481549	DIODE, MBRS140T3, RECTIFIER	D32
481552	DIODE, MBRS340T3, SCHOTTKY, 40V, 3A	D17
☆ 482586	LED LIGHT BAR, YELLOW, .38 X .35	D8
☆ 482587	LED LIGHT BAR, RED, .35 X .35	D33
☆ 482588	LED BAR GRAPH, 10 ELEMENT, RED, 1 X .400	D7
☆ 482589	LED 7 SEG DISPLAY, 10mm, BLK SURFACE, RED	D1-D3
☆ 482590	LED 7 SEG DISPLAY, 14.2mm, BLK SURF, RED	D4-D6
☆ 482591	LED, YELLOW, .100 SPACING	D13, D14
☆ 482592	LED, GREEN, .100 SPACING	D16
☆ 482593	LED, RED, .100 SPACING	D9-D12
☆ 482594	LED, BICOLOR, RED & GREEN, 3 LEAD, .100 SP	D15
☆ 482598	LED, HLMP-C100, RED, .100 SPACING	D28-D31
483018	TRANSISTOR, MMBT3906T, PNP	Q12
484060	TRANSISTOR, MMBT3904T, NPN	Q7
484541	VOLTAGE REGULATOR, LM317LD, +1.2V TO +37V	IC20
484553	IC, TL5001CD, PULSE WIDTH MOD CONT, 8 PIN	IC17
484554	VOLTAGE REGULATOR, LT1054CS8, SW CAP, 8 PIN	IC19
484557	VOLTAGE REGULATOR, LT1117CST-5, POS, 3 PIN	IC18
485532	TRANSISTOR, 2N7002T1, N-CHAN ENHAN MODE	Q1, Q2, Q5, Q6, Q9, Q13-Q16
485540	TRANSISTOR, SI9955DY, DUAL MOSFET, N-CHAN	Q8
485546	TRANSISTOR, VN0605T, N-CHAN ENHAN MODE	Q3, Q4
485547	TRANSISTOR, TPS11010, MOSFET, P-CHAN ENHAN	Q10, Q11
488041	IC, MAX7219CWG, DISPLAY DRVR, 8 DIGIT, 24 PIN	IC15
488308	IC, MCM60L256AF10, 32K X 8 CMOS SRAM	IC2
488318	IC, MC14020BD, 14-BIT BINARY COUNTER	IC6
488320	IC, SN74HC14D, HEX SCHMITT-TRIGGER INV	IC10
488321	IC, SN74HC138D, 3-LINE TO 8-LINE DECODER	IC11
488323	IC, SN74HC573DW, OCTAL D-TYPE LATCH	IC5, IC12, IC14
488324	IC, DG444DY, QUAD SPST CMOS ANALOG SW	IC28
488329	IC, SN74HC32D, QUAD 2-IN. POS OR GATE	IC8, IC9
488332	IC, AD7703BR, 20-BIT A TO D CONVERTER	IC23, IC24
488333	IC, HD6418ORCP-8X, 8-BIT MPU, HI INT, PLCC	IC1
488334	IC, MC14051BD, 8-CH ANALOG MUX/DEMUX	IC25
488342	IC, PCD3311CTDS, MUSICAL-TONE GEN, 18 PIN	IC32
488790	IC, TLE2022CD, DUAL OP AMP, H SPEED, L PWR	IC27
488794	IC, PM7524FS, 8-BIT D TO A CONV, 16 PIN	IC31
488795	IC, TLC549ID, 8-BIT A TO D CONV, SER CONT	IC26
488812	IC, AD780AR, 2.5 VOLTAGE REFERENCE, 8 PIN	IC29
488814	IC, AD820AR, FET INPUT OP AMP, 8 PIN	IC35
487084	IC, OP-282GS, DUAL JFET OP AMP, LOW PWR	IC21, IC22, IC30
487098	IC, MAX705CSA, UPROCESSOR SUPERVISORY CKT	IC4
487114	IC, MC34119D, AUDIO AMPLIFIER, L PWR, 8 PIN	IC16
☆ 515074	FUSE, PIGTAIL, 1/16A, 125V, VERY FAST-ACTING	F201
515083	FUSE WITH FUSEHOLDER, 1A, 125V, V FAST-ACT	F202
515085	FUSE WITH FUSEHOLDER, 2A, 125V, SLO-BLO	F203

NOTES:

☆ DENOTES THRU HOLE COMPONENTS.

DRAWING TABULATION

DWG NO.	TITLE	NEXT ASSY
D2723-17	MAIN BOARD SUBASSY, MODEL 515B & 515C	D2723/24-01
D2723-01	MAIN BOARD ASSY, MODEL 515B	D6500-01

REV	R NO.	DATE
01	N372	28Sep95

DO NOT SCALE. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm) BREAK ALL SHARP EDGES. TOLERANCES: DEC ± ~ (~), FRAC ± ~ (~), HOLES ±.007 -.003 (~), ANG ± ~. MATERIAL ~. FINISH ~.

TITLE: MAIN BOARD ASSY, MODEL 515B

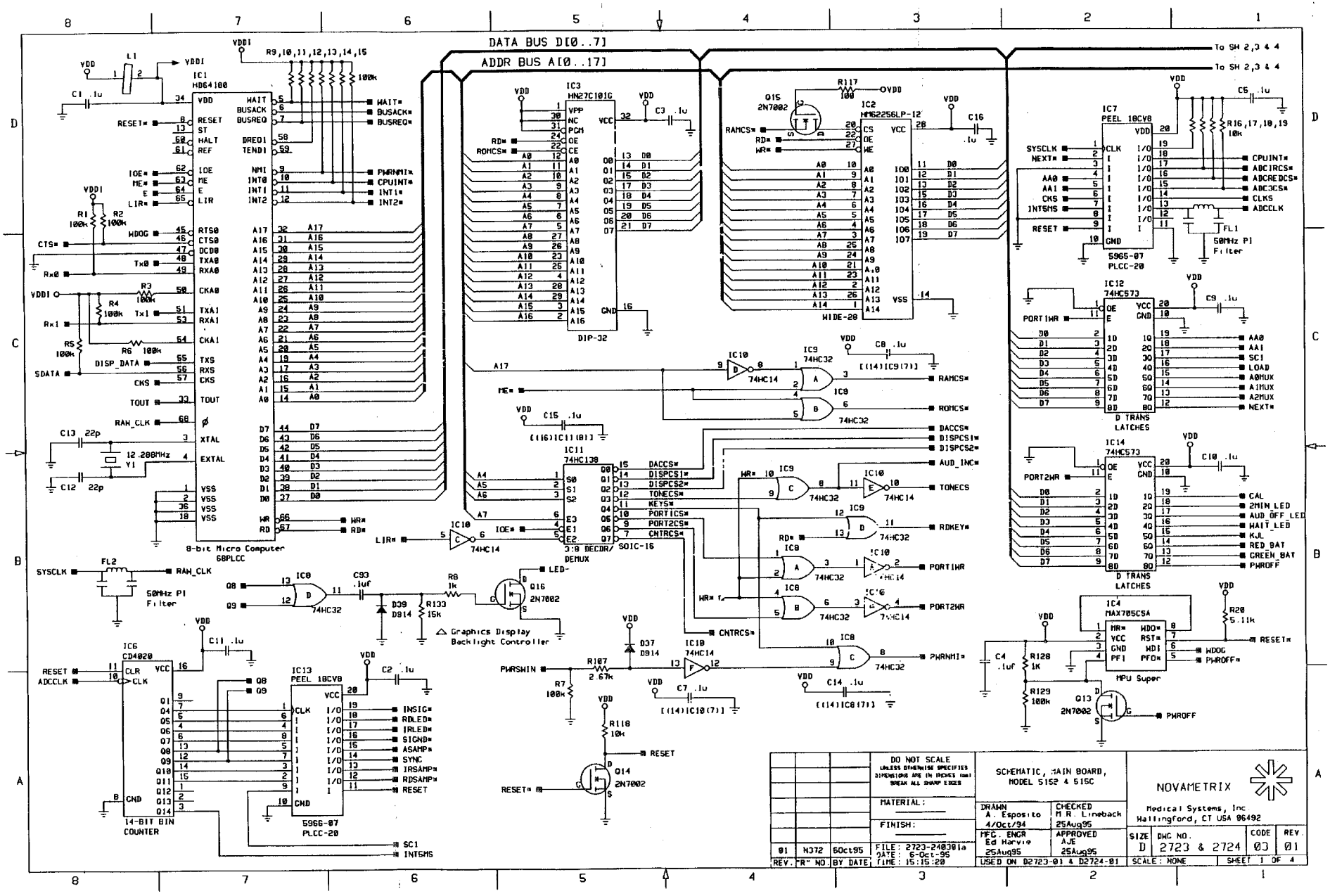
DRAWN RGG 25Jul95 | CHECKED MHL 25Aug95 | MFG ENGR EH 25Aug95 | APPROVED AJK 28Aug95

USED ON: SEE TABULATION

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO.	CODE	REV
D	2723	17 01	01

SCALE: NONE | SHEET 2 OF 2


DATA BUS D[0..7]
ADDR BUS A[0..17]
To SH 2,3 & 4
To SH 2,3 & 4
IC1 HD64180
8-bit Micro Computer
68PLCC
IC2 HM62256LP-12
WIDE-28
IC3 HN27C101G
DIP-32
IC4 MAX705CSA
MPU Super
IC5 74HC139
3:8 DECDR/ DEMUX
SOIC-16
IC6 CD4020
14-BIT BIN COUNTER
IC7 PEEL 18CV8
5965-07
PLCC-20
IC8 74HC32
IC9 74HC32
IC10 74HC14
IC11 74HC139
IC12 74HC573
D TRANS LATCHES
IC13 PEEL 18CV8
5966-07
PLCC-20
IC14 74HC573
D TRANS LATCHES
Y1 12.288MHz
FL1 50MHz PI Filter
FL2 50MHz PI Filter
Graphics Display Backlight Controller
DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES and BREAK ALL SHARP EDGES
MATERIAL:
FINISH:
SCHEMATIC, MAIN BOARD, MODEL 5152 & 515C
DRAWN A. Esposito 4/Oct/94
CHECKED M.R. Lineback 25Aug95
MFG. ENGR Ed Harvie 25Aug95
APPROVED AJE 25Aug95
USED ON D2723-01 & D2724-01
NOVAMETRIX
Medical Systems, Inc
Wallingford, CT USA 06492
SIZE D
DWG NO. 2723 & 2724
CODE 03
REV. 01
SCALE : NONE
SHEET 1 OF 4
01 N372 6Oct95 FILE: 2723-240301a DATE: 6-Oct-95 TIME: 15:15:20
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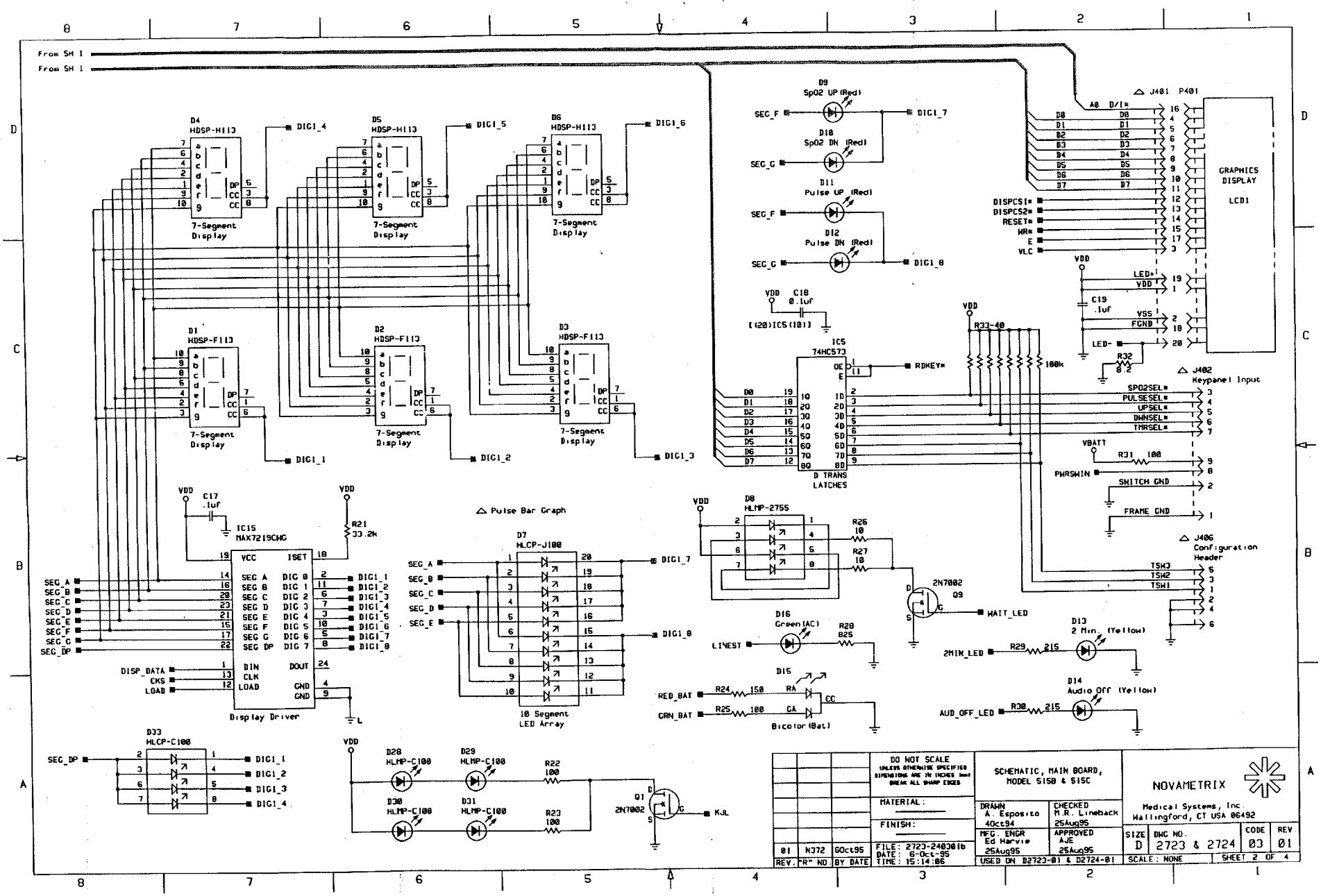
From SH 1
From SH 1
D4 HDSP-H113
D5 HDSP-H113
D6 HDSP-H113
7-Segment Display
DIG1_4
DIG1_5
DIG1_6
D1 HDSP-F113
D2 HDSP-F113
D3 HDSP-F113
DIG1_1
DIG1_2
DIG1_3
D9 SpO2 UP (Red)
D10 SpO2 DN (Red)
D11 Pulse UP (Red)
D12 Pulse DN (Red)
SEG_F
SEG_G
DIG1_7
DIG1_8
J401 P401
GRAPHICS DISPLAY LCD1
DISPCS1#
DISPCS2#
RESET#
WR#
E
VLC
C18 0.1uf
C19 .1uf
R32 8.2
IC5 74HC573
D TRANS LATCHES
RDKEY#
R33-40 100k
J402 Keypanel Input
SPO2SEL#
PULSESEL#
UPSEL#
DWNSEL#
TMRSEL#
VBATT
R31 100
PWRSWIN
SWITCH GND
FRAME GND
J406 Configuration Header
TSW3
TSW2
TSW1
C17 .1uf
IC15 MAX7219CWG
Display Driver
R21 33.2k
DISP_DATA
CKS
LOAD
△ Pulse Bar Graph
D7 HLCP-J100
10 Segment LED Array
D8 HLMP-2755
R26 10
R27 10
Q9 2N7002
WAIT_LED
D16 Green (AC)
R28 825
LINEST
D15
RED_BAT
GRN_BAT
R24 150
R25 100
Bicolor (Bat)
D13 2 Min. (Yellow)
R29 215
2MIN_LED
D14 Audio Off (Yellow)
R30 215
AUD_OFF_LED
D33 HLCP-C100
D28 HLMP-C100
D29 HLMP-C100
D30 HLMP-C100
D31 HLMP-C100
R22 100
R23 100
Q1 2N7002
KJL
DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] BREAK ALL SHARP EDGES
MATERIAL:
FINISH:
SCHEMATIC, MAIN BOARD, MODEL 5158 & 5ISC
DRAWN A. Esposito 4Oct94
CHECKED M.R. Lineback 25Aug95
MFG. ENGR Ed Harvie 25Aug95
APPROVED AJE 25Aug95
USED ON D2723-01 & D2724-01
NOVAMETRIX
Medical Systems, Inc.
Wallingford, CT USA 06492
SIZE D
DWG NO. 2723 & 2724
CODE 03
REV 01
SCALE: NONE
SHEET 2 OF 4
REV. 01
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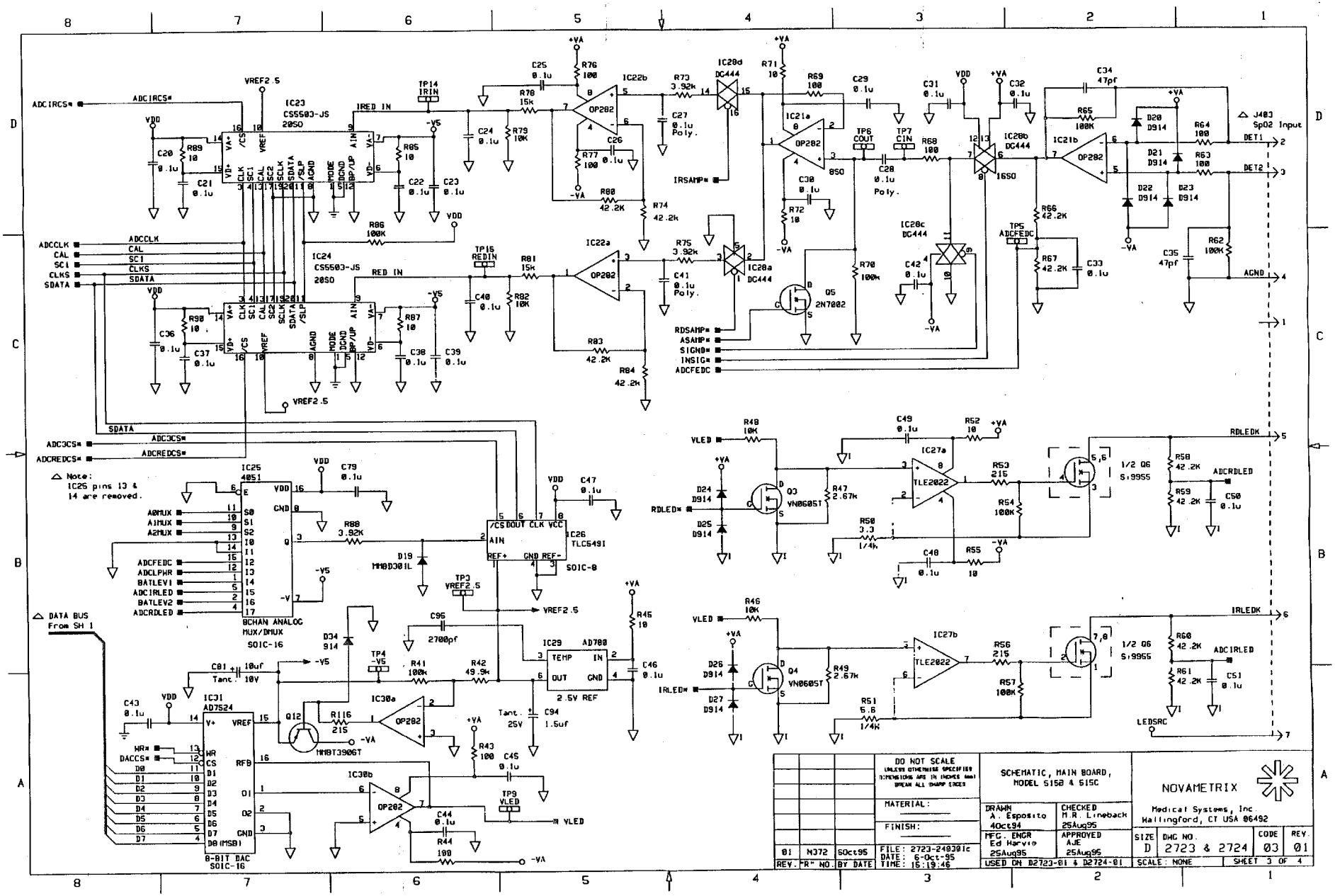
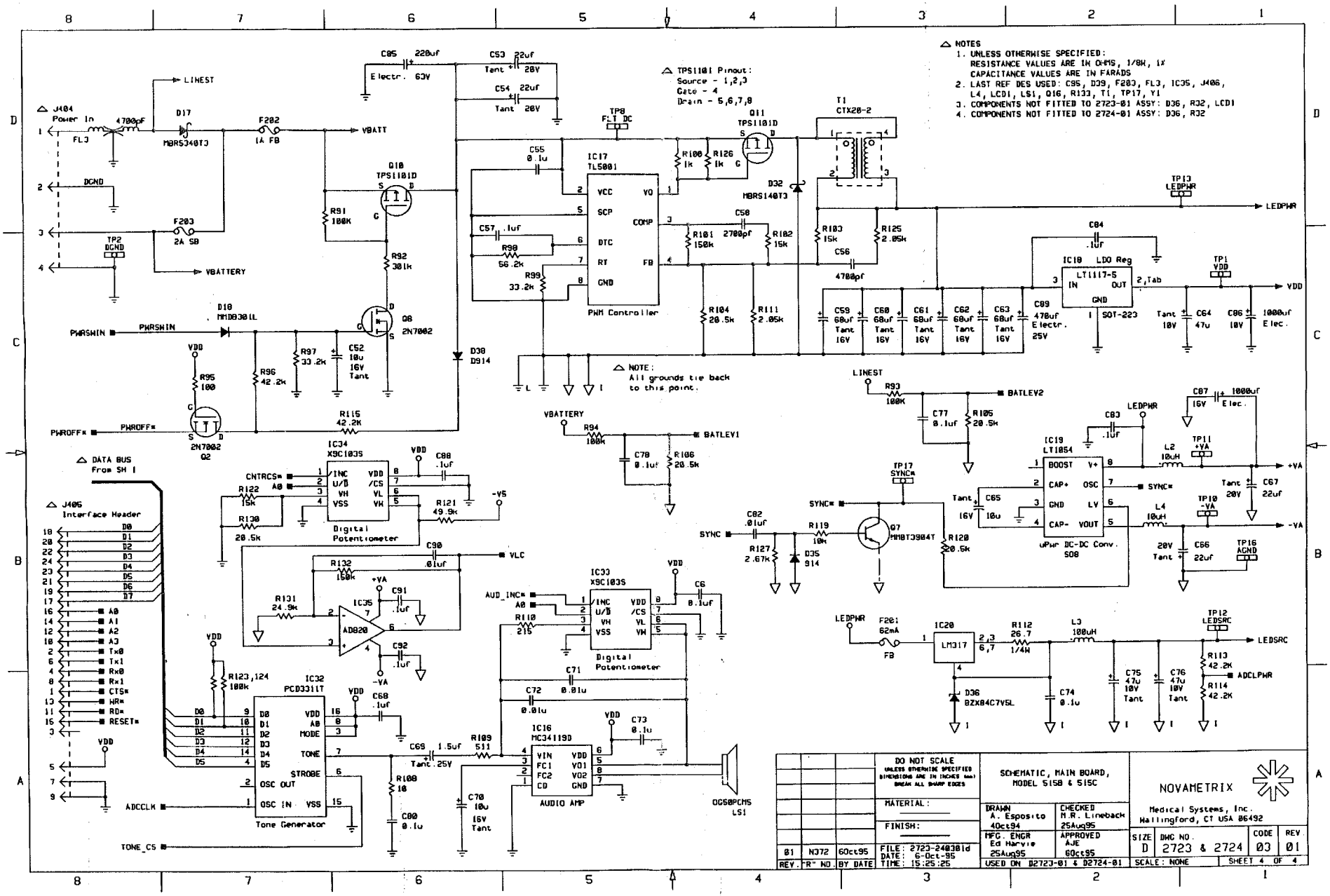
BY DATE GOct95
FILE: 2723-240301b
DATE: 6-Oct-95
TIME: 15:14:06


ADCIRCS*
VREF2.5
IC23 CS5503-JS 20SO
IRED IN
TP14 IRIN
IC22b OP282
IC28d DC444
IRSAMP*
IC21a OP282
IC28b DC444
IC21b OP282
J403 SpO2 Input
DET1
DET2
AGND
ADCCLK
CAL
SCI
CLKS
SDATA
IC24 CS5503-JS 20SO
RED IN
TP15 REDIN
IC22a OP282
IC28a DC444
IC28c DC444
Q5 2N7002
RDSAMP*
ASAMP*
SIGND*
INSIG*
ADCFEDC
TP5 ADCFEDC
TP6 COUT
TP7 CIN
ADC3CS*
ADCREDCS*
Note: IC25 pins 13 & 14 are removed.
IC25 4051
8CHAN ANALOG MUX/DMUX SOIC-16
A0MUX
A1MUX
A2MUX
ADCFEDC
ADCLPWR
BATLEV1
ADCIRLED
BATLEV2
ADCRDLED
IC26 TLC549I SOIC-8
D19 MMBD301L
TP3 VREF2.5
DATA BUS From SH 1
IC29 AD780 2.5V REF
IC30a OP282
IC30b OP282
IC31 AD7524 8-BIT DAC SOIC-16
Q12 MMBT3906T
WR*
DACCS*
D0
D1
D2
D3
D4
D5
D6
D7
D0(MSB)
TP4 -V5
TP9 VLED
VLED
RDLED*
IRLED*
IC27a TLE2022
IC27b TLE2022
Q3 VN0605T
Q4 VN0605T
D24 D914
D25 D914
D26 D914
D27 D914
1/2 Q6 Si9955
ADCRDLED
ADCIRLED
LEDSRC
DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] BREAK ALL SHARP EDGES
MATERIAL:
FINISH:
SCHEMATIC, MAIN BOARD, MODEL 515B & 515C
DRAWN A. Esposito 4Oct94
CHECKED M.R. Lineback 25Aug95
MFG. ENGR Ed Harvie 25Aug95
APPROVED AJE 25Aug95
USED ON D2723-01 & D2724-01
NOVAMETRIX
Medical Systems, Inc. Wallingford, CT USA 06492
SIZE D
DWG NO. 2723 & 2724
CODE 03
REV. 01
SCALE: NONE
SHEET 3 OF 4
01 N372 6Oct95
FILE: 2723-240301c
DATE: 6-Oct-95
TIME: 15:19:46
REV. PR" NO. BY DATE


NOTES
1. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS, 1/8W, 1%
CAPACITANCE VALUES ARE IN FARADS
2. LAST REF DES USED: C95, D39, F203, FL3, IC35, J406, L4, LCD1, LS1, Q16, R133, T1, TP17, Y1
3. COMPONENTS NOT FITTED TO 2723-01 ASSY: D36, R32, LCD1
4. COMPONENTS NOT FITTED TO 2724-01 ASSY: D36, R32
TPS1101 Pinout:
Source - 1,2,3
Gate - 4
Drain - 5,6,7,8
NOTE:
All grounds tie back to this point.
DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES BREAK ALL SHARP EDGES
MATERIAL:
FINISH:
FILE: 2723-240301d
DATE: 6-Oct-95
TIME: 15:25:25
SCHEMATIC, MAIN BOARD, MODEL 5158 & 515C
DRAWN A. Esposito 40ct94
CHECKED M.R. Lineback 25Aug95
MFG. ENGR Ed Harvie 25Aug95
APPROVED AJE 60ct95
USED ON D2723-01 & D2724-01
NOVAMETRIX
Medical Systems, Inc.
Hallingford, Ct USA 06492
SIZE D
DWG NO. 2723 & 2724
CODE 03
REV. 01
SCALE: NONE
SHEET 4 OF 4
REV. "R" NO. BY DATE
01 NJ72 60ct95

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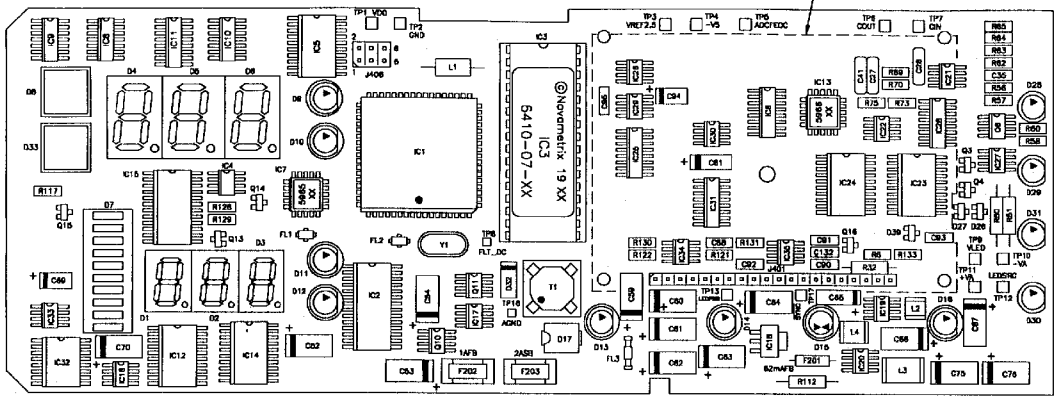
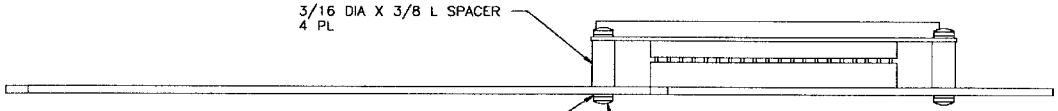
PN	DESCRIPTION	REF DES
D2723-17	MAIN BOARD SUBASSY, MODEL 515B & 515C	~
D2724-03	SCHEMATIC, MAIN BOARD, MODEL 515C	~
A2724-04	TEST PROCEDURE, MAIN BOARD, MODEL 515C	~
A5410-07	PROGRAM, EPROM ASSY, SpO2, 515B & 515C	IC3
280029	SPACER NO. 2-56 THD, 3/16 OD X 3/8 L	FOR LCD1
281204	SCREW, 2-56 X 3/16 L, PHILLIPS, STEEL	FOR LCD1
285012	LOCK WASHER, NO. 2, INTERNAL TOOTH, STEEL	FOR LCD1
482597	LCD DISPLAY, W LED BACKLIGHT & CONNECTOR	LCD1

GRAPHICS DISPLAY NOT SHOWN FOR CLARITY IN THIS VIEW. REFER TO DETAIL A FOR ASSEMBLED VIEW.



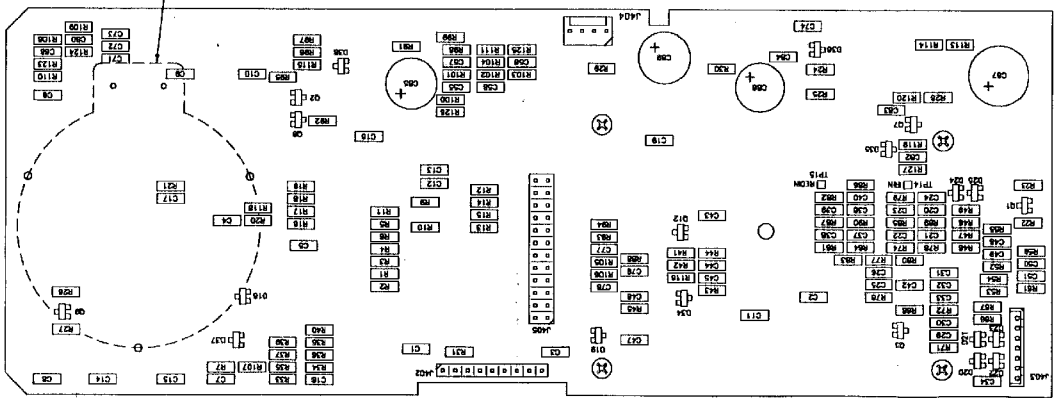
3/16 DIA X 3/8 L SPACER 4 PL

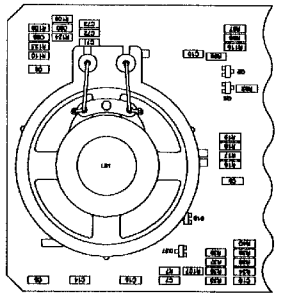


NO. 2 LOCK WASHER, INT TOOTH 8 PL (4 EA SIDE)

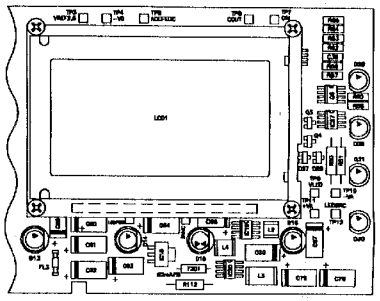
NO. 2-56 X 1/16 L SCREW, PHILLIPS 8 PL (4 EA SIDE)

SPEAKER NOT SHOWN FOR CLARITY IN THIS VIEW. REFER TO DETAIL B FOR ASSEMBLED VIEW.





DETAIL B
SCALE: NONE



DETAIL A
SCALE: NONE

NOTES:

1. THE FOLLOWING COMPONENTS ARE NOT FITTED TO D2723-17: D36, R32.
2. FOR TEST PROCEDURE SEE A2724-04.
3. PERMANENTLY MARK ASSEMBLY NUMBER "2724-01-XX" WITH CURRENT REVISION NUMBER.

REV	E NO.	DATE
01	N372	29Sep95

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (mm)
BREAK ALL SHARP EDGES
TOLERANCES
DEC X ±
FRAC ±
ANGLES ±
MATERIAL ~
FINISH ~

TITLE: MAIN BOARD ASSY, MODEL 515C

DRAWN: KKG 25Jul95 | CHECKED: JOE 25Aug95
MFG ENGR: EH 28Aug95 | APPROVED: AJE 28Aug95
USED ON: D8000 01

NOVAMETRIX MEDICAL SYSTEMS INC. WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO	CODE	REV
D	2724	01	01

SCALE: 2/1 | SHEET 1 OF 1

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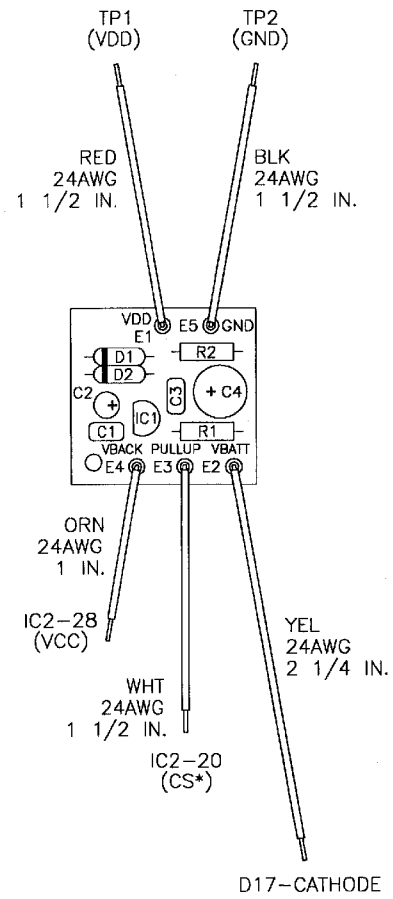

PN	DESCRIPTION	REF DES
2730-02	FAB, BATTERY BACKUP BOARD, 515B & 515C	~
B2730-03	SCHEMATIC, BATTERY BACKUP BOARD	~
152040	CAPACITOR, 2.2uF, 35V, TANTALUM, ELECTROLYTIC	C2
152075	CAPACITOR, 47uF, 25V, 20%, AL, ELECTROLYTIC	C4
154016	CAPACITOR, .1uF, 50V, 10%, X7R, .1 SPACING	C1, C3
472007	RESISTOR, 475 OHM, 1/4W, 1%	R1
472058	RESISTOR, 100k OHM, 1/4W, 1%	R2
481501	DIODE, 1N4148, SIGNAL, SILICONE, HIGH SPEED	D2
481534	DIODE, BAT82, SCHOTTKY, MINIATURE, DO-34	D1
484533	VOLTAGE REGULATOR, MIC2950-02BZ-5.0, ADJ	IC1
605103	WIRE, 24AWG, BLACK, STRANDED	(E5)
605105	WIRE, 24AWG, RED, STRANDED	(E1)
605106	WIRE, 24AWG, ORANGE, STRANDED	(E4)
605107	WIRE, 24AWG, YELLOW, STRANDED	(E2)
605112	WIRE, 24AWG, WHITE, STRANDED	(E3)

NOTES:

1. WIRE PREPARATION:
   A. ALL WIRES TO HAVE 1/8 IN. STRIP AND TIN ON EACH END.
   B. REFER TO FIELD OF DRAWING FOR WIRE LENGTHS AND WIRE LOCATIONS ON 2730-01 BOARD.
2. REFER TO FIELD OF DRAWING FOR WIRE DESTINATION POINTS ON THE 2721-01 THRU 2724-01 BOARDS.

REV	R NO.	DATE

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES (mm)
BREAK ALL SHARP EDGES
TOLERANCES
DEC ± ~ (mm) ± ~
FRAC ± 1/16 (mm) ± ~
HOLES +.007 -.003 (mm) (+.18 -.08)
ANG ± ~
MATERIAL ~
FINISH ~

TITLE: BATTERY BACKUP BOARD ASSY, MODEL 515B & 515C

DRAWN 21Mar96 M.R. Linebank | CHECKED LM 3/21/96
MFG ENGR BH 3-25-96 | APPROVED 3/21/96
USED ON: ~

NOVAMETRIX
MEDICAL SYSTEMS INC.
WALLINGFORD, CT U.S.A. 06492

SIZE	DRAWING NO.	CODE	REV
C	2730	01	00

SCALE: 2/1 | SHEET 1 OF 1

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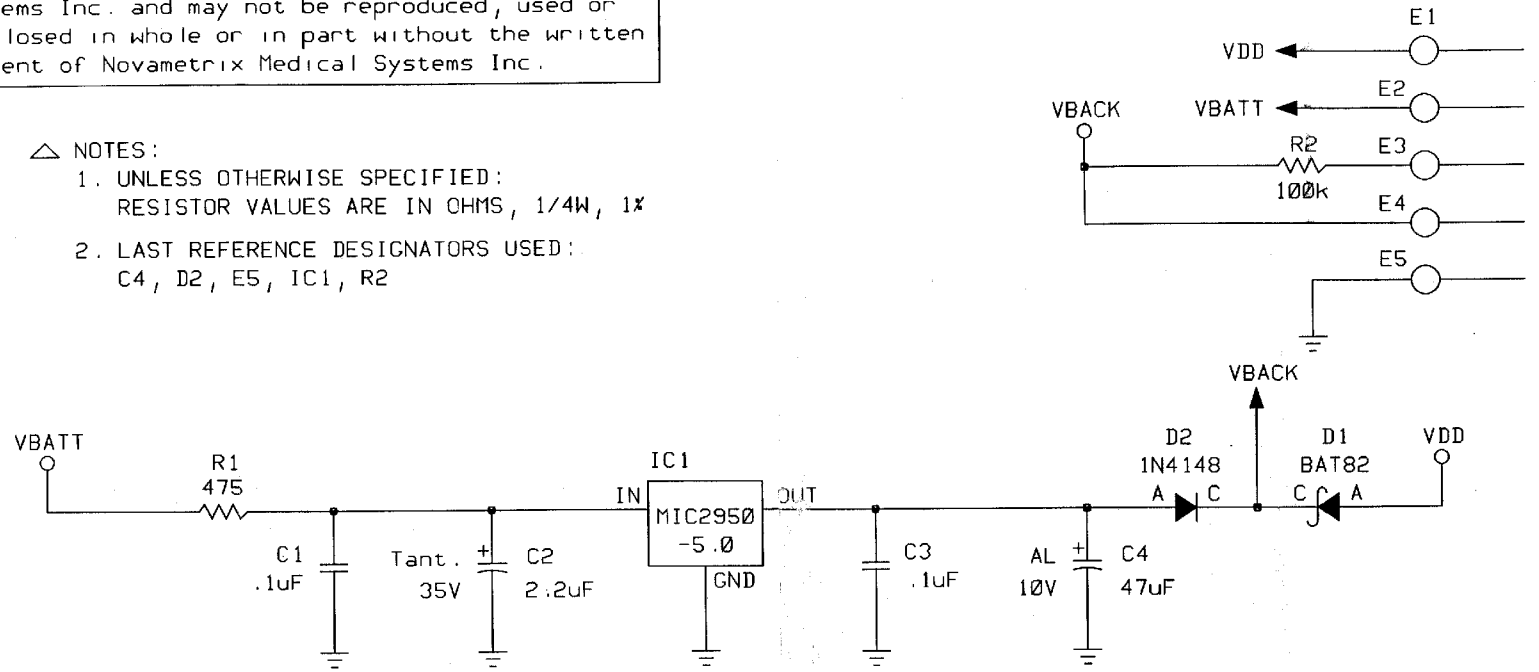
△ NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   RESISTOR VALUES ARE IN OHMS, 1/4W, 1%
2. LAST REFERENCE DESIGNATORS USED:
   C4, D2, E5, IC1, R2



REV.	"R" NO.	BY DATE

DO NOT SCALE
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES (mm)
BREAK ALL SHARP EDGES

MATERIAL:
21-Mar-96

FINISH:
15:52:57
27300300

SCHEMATIC, BATTERY BACKUP BOARD, MODEL 515B & 515C

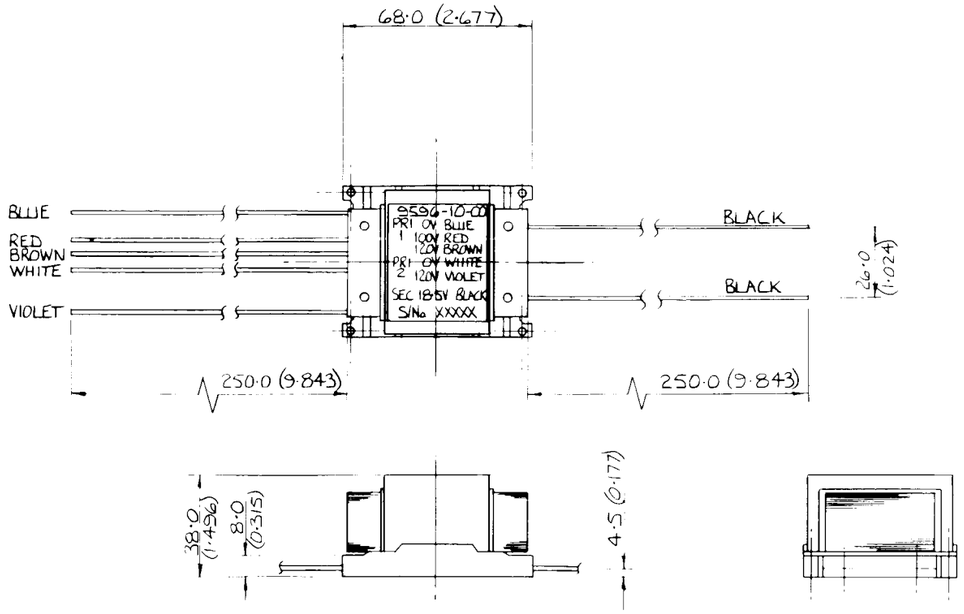
DRAWN	CHECKED
A. Esposito 16-Feb-96	M.R. Lineback 22Mar96
MFG. ENGR	APPROVED 3/21/96
USED ON C2730-01	

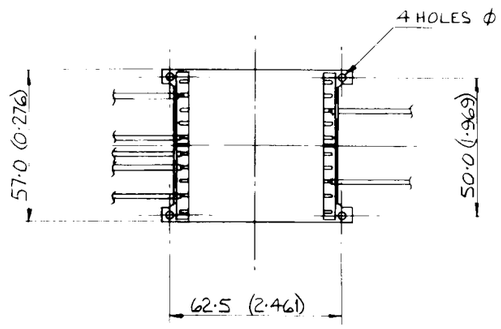
NOVAMETRIX
Medical Systems, Inc.
Wallingford, CT USA 06492

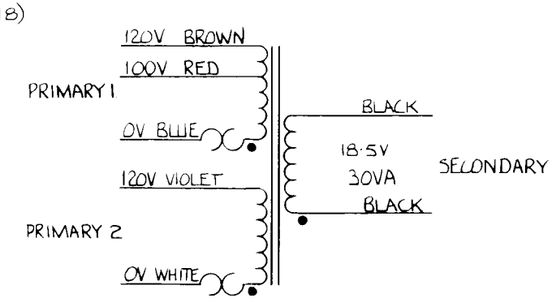
SIZE	DWG NO.	CODE	REV.
B	2730	03	00

SCALE: NONE | SHEET 1 OF 1

PROJECTION







SCHEMATIC

SPECIFICATIONS

1. ALL WIRES & MATERIALS USED WITHIN THE TRANSFORMER WINDING TO BE RATED FOR AT LEAST 135° C OPERATION (CLASS E INSULATION)
2. ALL CONNECTIONS TO BE BROUGHT OUT ON FLYING LEADS WITH AT LEAST 250·0 (9·85) AVAILABLE LENGTH.
3. PRIMARY:- 0-100-120V. 0-120V; 50-60 Hz.
4. SECONDARY:- 0-18·5V, 30VA.
5. BOBBIN MATERIAL GLASS FIBRE REINFORCED A-POLYAMID TYPE PA6.6-30H. (MANUFACTURED BY WEISSER)
6. WINDING WIRE TO BE BS 4520 GRADE 1.
7. TRANSFORMER TO HAVE A SERIAL No AS SHOWN
8. PROTECTIVE DEVICES:- THERMAL CUTOUTS TO BE UL APPROVED 135°C.
9. IMPREGNATE WITH VARNISH UL APPROVED.
10. ISOLATION TEST: WINDING TO WINDING 4 KV AC RMS FOR 1 MINUTE
    WINDINGS TO LAMINATIONS 2KV AC RMS FOR 1 MINUTE
11. LEADOUT WIRES TO UL/CSA APPROVED STANDARD STYLE UL1061 7/32 24AWG WIRE INSULATION TO BE COLOURED AS SHOWN.
12. CERTIFICATION OF COMPLIANCE IS REQUIRED FOR ALL MATERIALS AND/OR FINISHES SPECIFIED WITH EACH INITIAL SHIPMENT OF A PURCHASE ORDER.

FOR EXPLANATION OF DIMENSIONING AND SYMBOLS SEE BS308

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REV	R No	BY	DATE

DIMS. IN mm. (In.) DO NOT SCALE
TOLERANCES EXCEPT WHERE OTHERWISE STATED
mm. 0·50
In. 0·020
deg.

TITLE: TRANSFORMER MAINS

SHEET | MATERIAL

DRAWN	CHECKED	APPROVED
STRIJAN	R.J.R	
DATE 11 JAN 89	DATE 26 JAN 89	DATE 26/Jan/89

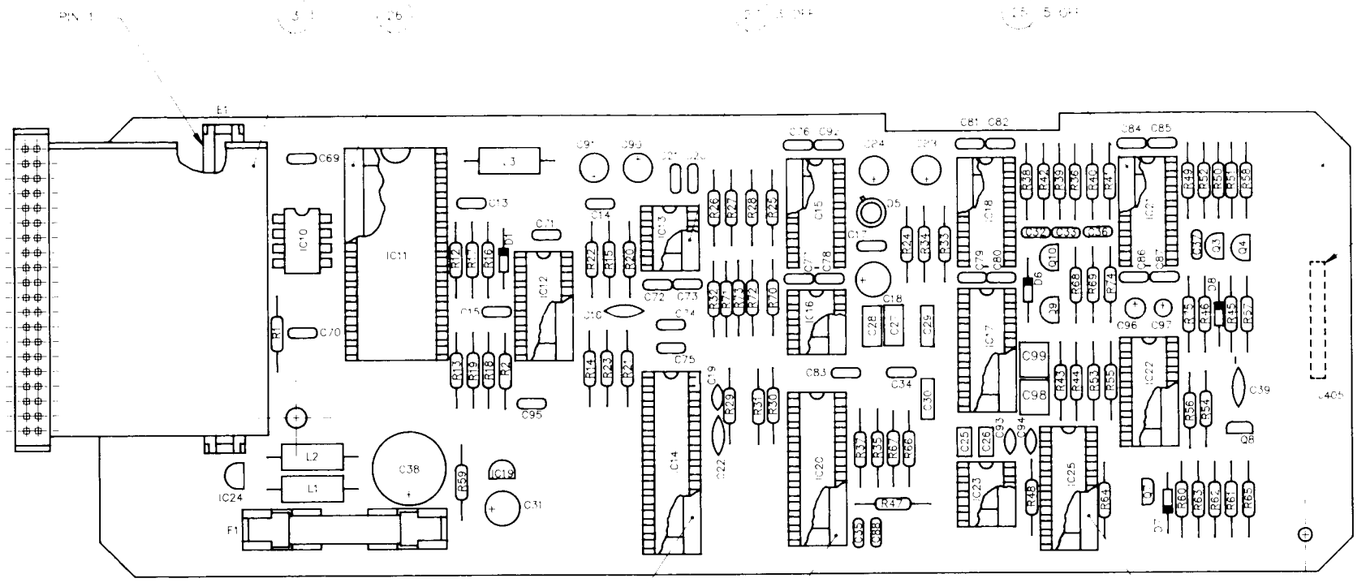
SCALE: FULL SIZE | USED ON: 515

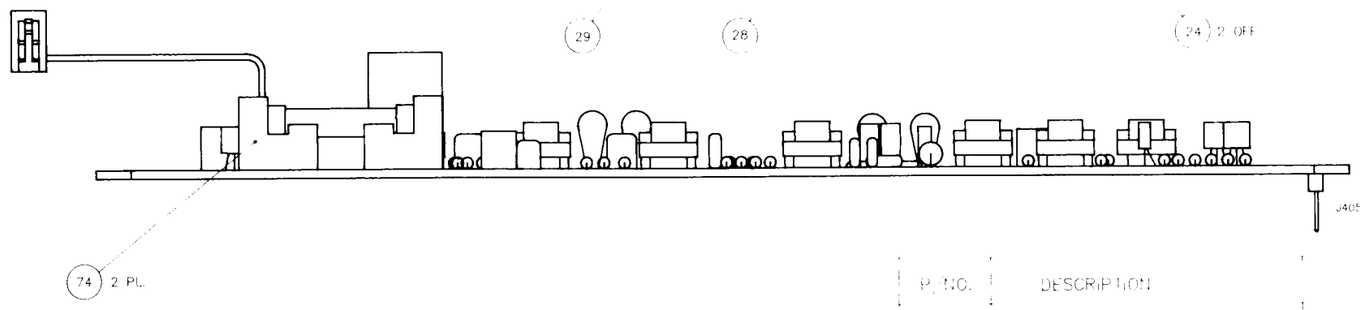
NOVAMETRIX MEDICAL SYSTEMS LTD.
A SUBSIDIARY OF NOVAMETRIX MEDICAL SYSTEMS INC.

PART NUMBER

SIZE	DRG. NO.	CODE	REV.
D	9596	10	00

PROJECTION





P/NO.	DESCRIPTION	REFERENCE
486284	SI8601DJ A.D.C.	IC11
486772	LMC660CN QUAD OP AMP	IC12
487053	AD712JN DUAL OP AMP	IC13
486771	AD7537KN DUAL 12 BIT DAC	IC14
486712	TLO74CN QUAD OP AMP	IC15,18,21,22
486744	TLO72CP DUAL OP AMP	IC16
486268	DG211 ANALOG SWITCH	IC17,25
484529	LM78L05ACZ REGULATOR	IC19,24
486293	PM7528HP CMOS INTERFACE	IC20
486028	NMC9346 1024 BIT EEPROM	IC10
486716	LM393N DUAL COMPARATOR	IC23
21121*	7 PIN HEADER S.I.L.	J405
515042	5 10A 250V FAST B.C. 3AG	F1

P/NO.	DESCRIPTION	REFERENCE
472011	1K 1/4W 1%	R2
472030	10K 1/4W 1%	R24,59,64,65
472043	24.9K 1/4W 1%	R21
472055	80.6K 1/4W 1%	R22
472058	100K 1/4W 1%	R1,12,13,14,26,27,33,34 40,45,57,58,62,63,72,73
472065	200K 1/4W 1%	R15,17,18,19,20,29,53,54
472097	14.7K 1/4W 1%	R35,36
472156	26.7K 1/4W 1%	R23
472188	5.49K 1/4W 1%	R25
472036	13.3K 1/4W 1%	R28
472022	4.99K 1/4W 1%	R30
472070	402K 1/4W 1%	R31
472057	90.9K 1/4W 1%	R16
472201	78.7K 1/4W 1%	R37,38
472023	5.11K 1/4W 1%	R39
472264	1.47K 1/4W 1%	R41
472113	2.43K 1/4W 1%	R42
472199	9.76K 1/4W 1%	R43,50
472003	100 OHM 1/4W 1%	R44,51,68,69
472179	24.3K 1/4W 1% 50PPM	R46
472146	47.5K 1/4W 1%	R47,48
472032	11K 1/4W 1%	R49
472263	2.74K 1/4W 1%	R52
472053	64.9K 1/4W 1%	R55,56
472198	3.3 OHM 1/4W 1%	R60
472200	5.6 OHM 1/4W 1%	R61
472071	470K 1/4W 1%	R66,67
474077	ZERO OHMS	R70,71
470008	4.7 OHM 1/4W 10%	R74,75
472075	1M 1/4W 1%	R32
153046	.0047uF 100V 10% CERAMIC	C13
153019	.047uF 50V +80% -20% CERAMIC	C15
154032	1uF 63V 10% POLYESTER	C98,99
154016	.1uF CERAMIC 1SP	C14,17,20,21,32,69 33,34,35,36,37,70-88,92,95
154037	.1uF 63V 20% POLYESTER RADIAL 1SP	C25,26,29,30
154035	10pF CERAMIC PLATE .1SP	C16
152071	6.8uF 50V ELECTROLYTIC 1SP	C18
153013	33pF CERAMIC .1SP	C19,93,94
153031	100pF CERAMIC 100V 2%	C22
152067	100uF 16V TANT	C90,91
154028	0.22uF 63V 5% METAL POLY. FILM 5mm SP.	C27,28
152058	470uF 16V RADIAL 2" PITCH ELECTLT	C38
152041	470uF 16V (ALTERNATIVE)	
152072	10uF 50V ELECTROLYTIC	C31
153006	47pF CERAMIC	C39
152048	4.7uF 16V TANT	C96,97
152040	2.2uF 35V TANT	C23,24
481000	ICL8069 ZENER DIODE	D5
481501	1N4148 SIGNAL DIODE	D6,7,8
481534	BAT85 SCHOTTKY MINIATURE DO-34 PACKAGE	D1
485510	VN10LM TRANSISTOR VMOS FET	Q3,4,9,10
484014	ZTX109C TRANSISTOR	Q7,8
180004	100uH CHOKE	L1 ,2,3

FOR EXPLANATION OF DIMENSIONING AND SYMBOLS SEE BS308

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REV.	P.NO	BY	DATE
01	P23	S.T.M.	15MAR89

DIMS. in mm (in.) DO NOT SCALE

TOLERANCES EXCEPT WHERE OTHERWISE STATED

mm

.0

deg

ASSEMBLY

SHEET	MATERIAL
1 OF 1	

DRAWN	CHECKED	APPD.
S.T.M.	R.F.	G.A.T.
DATE 06OCT88	DATE 02JAN89	DATE 02JAN89

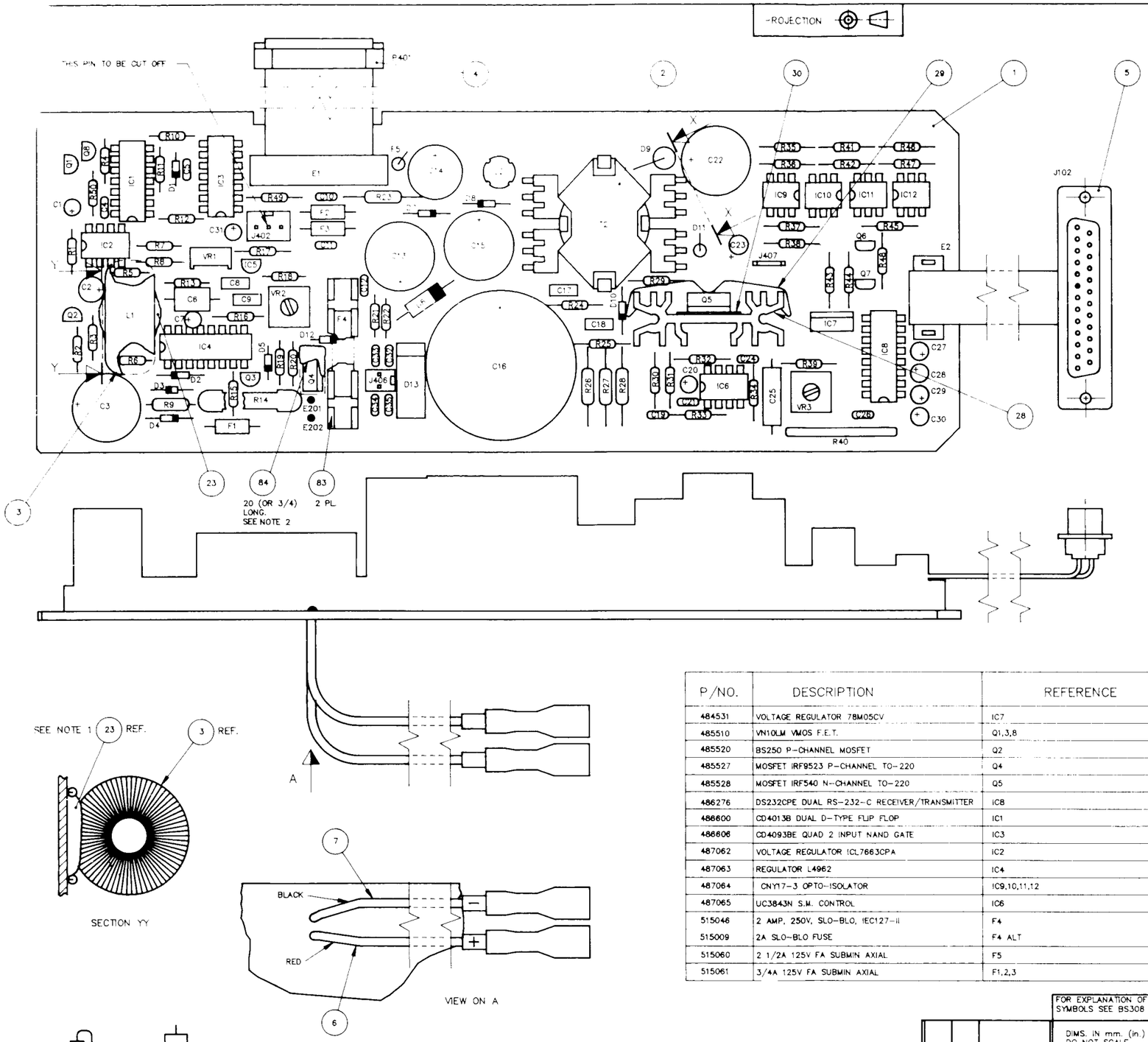
SCALE 2/1

USED ON 575

NOVAMETRIX
MEDICAL SYSTEMS LTD.
A SUBSIDIARY OF
NOVAMETRIX MEDICAL SYSTEMS INC.

PART NUMBER

SIZE	DRG. NO.	CODE	REV.
D	2288	07	01



P/NO.	DESCRIPTION	REFERENCE
484531	VOLTAGE REGULATOR 78M05CV	IC7
485510	VN10LM VMOS F.E.T.	Q1,3,8
485520	BS250 P-CHANNEL MOSFET	Q2
485527	MOSFET IRF9523 P-CHANNEL TO-220	Q4
485528	MOSFET IRF540 N-CHANNEL TO-220	Q5
486276	DS232CPE DUAL RS-232-C RECEIVER/TRANSMITTER	IC8
486600	CD4013B DUAL D-TYPE FLIP FLOP	IC1
486606	CD4093BE QUAD 2 INPUT NAND GATE	IC3
487062	VOLTAGE REGULATOR ICL7663CPA	IC2
487063	REGULATOR L4962	IC4
487064	CNY17-3 OPTO-ISOLATOR	IC9,10,11,12
487065	UC3843N S.M. CONTROL	IC6
515046	2 AMP, 250V, SLO-BLO, IEC127-II	F4
515009	2A SLO-BLO FUSE	F4 ALT
515060	2 1/2A 125V FA SUBMIN AXIAL	F5
515061	3/4A 125V FA SUBMIN AXIAL	F1,2,3

P/NO.	DESCRIPTION	REFERENCE
152040	2.2uF 35V TANTALUM	C1,7,20,31
152045	10uF 16V 0.2" PITCH	C27,28,29,30
152065	10uF 25V TANTALUM	C23
152074	1000uF 16V RADIAL 5.0 PITCH	C14
152075	47uF 25V ELECTROLYTIC RADIAL 2.5 PITCH	C2
152076	1500uF 25v RADIAL 7.5 PITCH	C13,15,22
152077	10000uF 35V 10.0 PITCH	C16
152078	2200uF 25V ELECTROLYTIC 0.3 SPACING	C3
153037	470pF 50V 5% 0.1 PITCH SHORT LEADS	C21,19
154016	0.1uF, 50V, 0.1 SP MULTILAYER CERAMIC	C4,5,10,11,12,24,26,32,33,34,35
154041	0.01uF 1% 63V POLYSTYRENE	C25
154056	2200pF 1% POLYSTYRENE	C8
154057	470pF 100V 10% 5.0 PITCH	C9
154058	0.022uF 100V 10% 5.0 PITCH	C17
154059	0.047uF 63V 10% 5.0 PITCH	C6
154060	0.22uF 63v 10% 5.0 PITCH	C18
180010	15uH TOKO 8RBS	L2
211222	2 PIN HEADER STRT LOCKING 0.1 SPACING	J406
211314	CONNECTOR 3 PIN HEADER STRT LOCKING 0.1 SPCG	J402
216058	TERMINAL LUG BLADE 3/16 (4.8) STRT PC MOUNT	J407
470110	0.22 OHM 1/2W 10%	R23
470111	0.33 OHM 1/2W 10%	R9,26,27,28
471400	100M 1W 5% 0.9 PITCH	R40
472003	100 OHM 1/4W 1%	R5,17
472007	475 OHM 1/4W 1%	R1,24,35,36,45,48
472011	1K 1/4W 1%	R25,30
472021	4.75K 1/4W 1%	R18,29
472030	10K 1/4W 1%	R19,49
472034	12.1K 1/4W 1%	R3
472058	100K 1/4W 1%	R4,7,10,11,41,42,43,44,50
472065	200K 1/4W 1%	R22
472085	8.25K 1/4W 1%	R15
472121	3.75K 1/4W 1%	R39
472140	332K 1/4W 1%	R8,33
472146	47.5K 1/4W 1%	R12,16,37,38,46,47
472170	22.1K 1/4W 1%	R13,31
472225	68 OHM 1/4W 1% METAL FILM	R6
472266	2.7K 1/4W 1%	R20
472267	22 OHM 1/4W 1%	R2,32
472268	8.66K 1/4W 1%	R34
472270	1.2M 1/4W 1%	R21
474112	5.6 OHM 4W 5% 15.2 SP. WIREWOUND	R14
475033	POTENTIOMETER 1K CERMET TOP ADJ SINGLE TURN	VR2
475034	POTENTIOMETER 2K CERMET TOP ADJ SINGLE TURN	VR3
475036	POTENTIOMETER 50K CERMET SIDE ADJ SINGLE TURN	VR1
481004	ZENER 10V	D5
481022	ZENER BZY88C12 12V 500MW	D12
481028	ZENER BZV85C10 10V 1W	D3
481501	1N4148 SILICON GENERAL PURPOSE SIGNAL	D1
481516	11DQ03 SCHOTTKY	D2,4
481523	1N4002 RECTIFIER 100V	D7,8,10,11
481536	RECTIFIER 1N5400	D6,9
481537	2KBP02 BRIDGE RECTIFIER	D13
483011	PNP ZTX214C	Q6,7
484529	VOLTAGE REGULATOR 78L05	IC5

NOTES
1. ITEM 3 TO BE BEDDED IN ITEM 23 AS SHOWN
2. ITEM 84 (20 (3/4) LONG) TO COMPLETELY COVER Q4

FOR EXPLANATION OF DIMENSIONING AND SYMBOLS SEE BS308

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REV	R No	BY	DATE
01	P23	S.T.M.	14MAR89

DIMS. IN mm. (in.) DO NOT SCALE

TOLERANCES EXCEPT WHERE OTHERWISE STATED

mm.

in.

deg.

TITLE: ASSEMBLY POWER SUPPLY BOARD

SHEET 1 OF 1

MATERIAL

DRAWN	CHECKED	APPROVED
S.T.M.	R.J.F.	G.L.M.
DATE 02FEB89	DATE 08FEB89	DATE 08FEB89

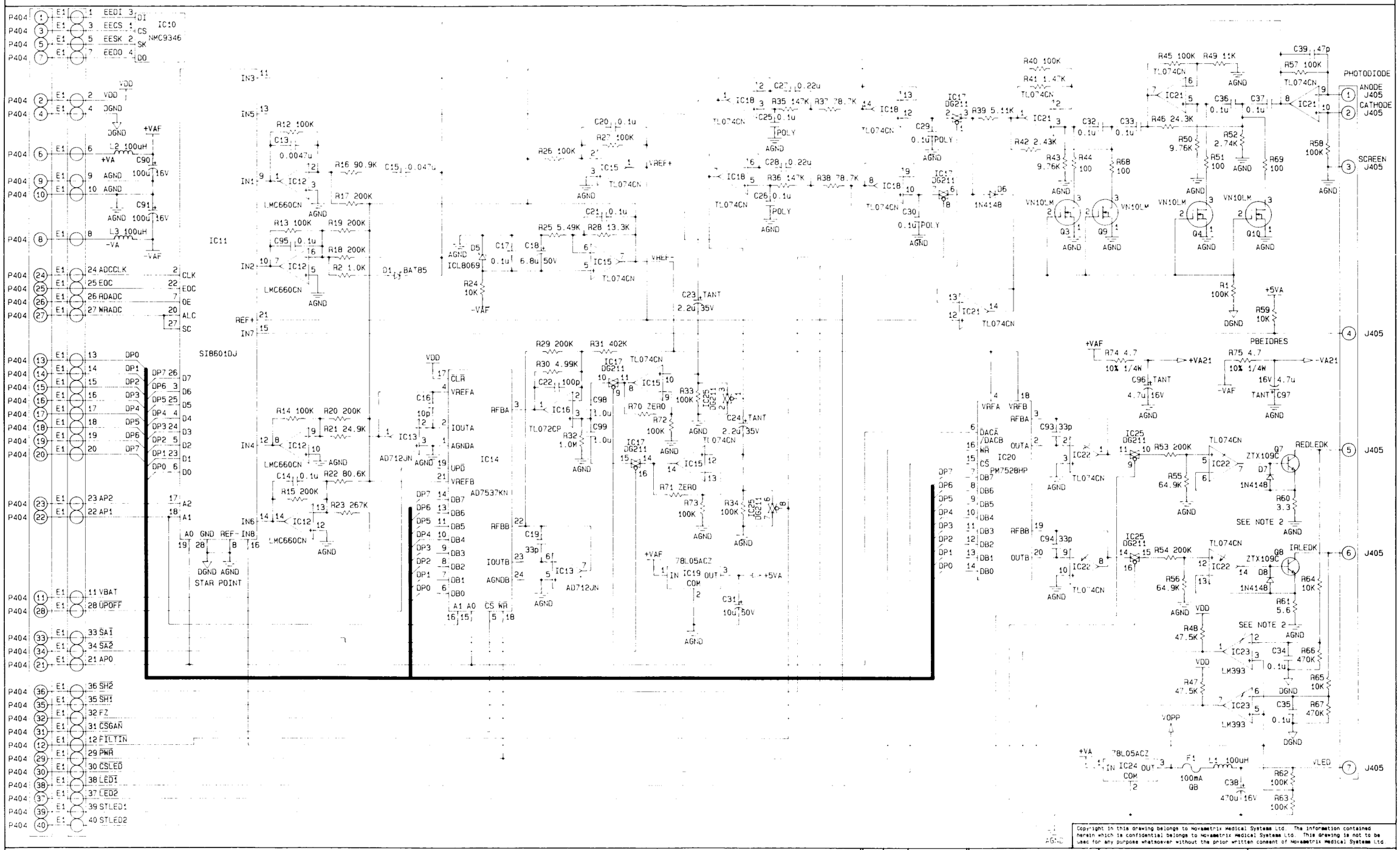
SCALE 2:1

USED ON 515

NOVAMETRIX MEDICAL SYSTEMS LTD.
A SUBSIDIARY OF NOVAMETRIX MEDICAL SYSTEMS INC.

PART NUMBER

SIZE	DRG. NO.	CODE	REV.
D	2503	01	01


IC10 NMC9346
EEDI EECS EESK EEDO
VDD DGND +VAF +VA -VA -VAF AGND
L2 100uH L3 100uH C90 100u 16V C91 100u 16V
IC11 SI8601DJ
24 ADCCLK 25 EOC 26 RDADC 27 WRADC
DP0 DP1 DP2 DP3 DP4 DP5 DP6 DP7
D7 D6 D5 D4 D3 D2 D1 D0
23 AP2 22 AP1
A2 A1 A0
11 VBAT 28 UPOFF
33 SA1 34 SA2 21 AP0
36 SH2 35 SH1 32 FZ 31 CSGAN 12 FILTIN 29 PWR 30 CSLED 38 LED1 37 LED2 39 STLED1 40 STLED2
IN1 IN2 IN3 IN4 IN5 IN6 IN7 IN8
R12 100K C13 0.0047u R16 90.9K C15 0.047u R17 200K
R13 100K C95 0.1u R19 200K R18 200K R2 1.0K
D1 BAT85
R14 100K R20 200K R21 24.9K R22 80.6K R15 200K R23 267K
LMC660CN
REF+ REF- GND
DGND STAR POINT
IC12 IC13 IC14 AD712JN AD7537KN
C14 0.1u C16 10p
R24 10K D5 ICL8069 C17 0.1u C18 6.8u 50V
C20 0.1u R27 100K R26 100K IC15 TL074CN VREF+
C21 0.1u R25 5.49K R28 13.3K VREF-
C23 TANT 2.2u 35V
R29 200K R31 402K R30 4.99K C22 100p R32 1.0M IC16 TL072CP
C98 1.0u C99 1.0u
R70 ZERO R72 100K R71 ZERO R73 100K R33 100K R34 100K C24 TANT 2.2u 35V
IC17 DG211 IC25 DG211
RFBA RFBB IOUTA IOUTB AGNDA AGNDB UPO VREFA VREFB CLR
DB7 DB6 DB5 DB4 DB3 DB2 DB1 DB0
A1 A0 CS WR
C19 33p C39 47p
+VAF 78L05ACZ IC19 +5VA C31 10u 50V
C22 0.22u C25 0.1u C26 0.1u C27 0.22u C28 0.22u C29 0.1u C30 0.1u
IC18 TL074CN POLY
R35 147K R37 78.7K R36 147K R38 78.7K
R40 100K R41 1.47K R42 2.43K R39 5.11K
D6 1N4148
R45 100K R49 11K R46 24.3K R50 9.76K R51 100 R52 2.74K R57 100K R58 100K
IC21 TL074CN C32 0.1u C33 0.1u C36 0.1u C37 0.1u
R43 9.76K R44 100 R68 100 R69 100
VN10LM Q3 Q9 Q4 Q10
R1 100K R59 10K +5VA DGND
PHOTODIODE ANODE J405 CATHODE J405 SCREEN J405 PBEIDRES J405
+VAF R74 4.7 10% 1/4W +VA21 R75 4.7 10% 1/4W -VA21
C96 TANT 4.7u 16V C97 TANT 4.7u 16V
IC20 PM7528HP
R53 200K R55 64.9K R60 3.3 SEE NOTE 2
IC22 IC25 ZTX109C Q7 1N4148 REDLEDK J405
R54 200K R56 64.9K R64 10K R61 5.6 IRLEDK J405
Q8
R48 47.5K R47 47.5K R66 470K R65 10K R67 470K C34 0.1u C35 0.1u
IC23 LM393
VOPP
+VA 78L05ACZ IC24 F1 100mA QB L1 100uH C38 470u 16V R62 100K R63 100K VLED J405
C93 33p C94 33p
OUTA OUTB
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ALL RESISTANCES IN OHMS
ALL CAPACITANCES IN FARADS
DRAWN STROM 2-MAY-88
CHECKED 2-JUN-89
APPD 2-JUN-89
NOVAMETRIX MEDICAL SYSTEMS LTD.
A SUBSIDIARY OF NOVAMETRIX MEDICAL SYSTEMS INC.
PART NUMBER
SIZE D DRG. NO. 2288 CODE 03 REV 01
SHEET 1 OF 2
01 PCS SHM 12MAY89

		POWER SUPPLIES											DECOUPLING			
IC	TYPE	PINS	+5VA	+VA	+VAF	AGND	-VAF	VDD	DGND	VOPP	+VA21	-VA21	REF	VALUE	FROM	TO
10	NMC9346	8						8	5				C69	0.1u	VDD	DGND
11	SI8601DJ	28						1	28				C70	0.1u	VDD	DGND
12	LMC660CN	14	4			11							C71	0.1u	+5VA	AGND
13	AD712JN	8			8		4						C72	0.1u	+VAF	AGND
													C73	0.1u	-VAF	AGND
14	AD7537KN	24			20	1, 24			12				C74	0.1u	+VAF	AGND
													C75	0.1u	+VAF	DGND
15	TL074CN	14			4		11						C76	0.1u	+VAF	AGND
													C92	0.1u	-VAF	AGND
16	TL072CP	8			8		4						C77	0.1u	+VAF	AGND
													C78	0.1u	-VAF	AGND
17	DG211	16			13	5	4	12					C79	0.1u	+VAF	AGND
													C80	0.1u	-VAF	AGND
18	TL074CN	14			4		11						C81	0.1u	+VAF	AGND
													C82	0.1u	-VAF	AGND
19	LM78L05ACZ	3	O/P		I/P	COM										
20	PM7528HP	20				1		17	5				C83	0.1u	VDD	AGND
21	TL074CN	14									4	11	C84	0.1u	+VA21	AGND
													C85	0.1u	-VA21	AGND
22	TL074CN	14			4		11						C86	0.1u	+VAF	AGND
													C87	0.1u	-VAF	AGND
23	LM393	8							4	8			C88	0.1u	VOPP	DGND
24	LM78L05ACZ	3		I/P		COM										
25	DG211	16			13	5	4	12								

LAST USED REFERENCES

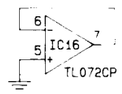
RESISTORS	R75
CAPACITORS	C99
DIODES	D8
INDUCTORS	L3
TRANSISTORS	Q10
INTEGRATED CIRCUITS	IC25
FUSES	F1

NOT USED

R3 THROUGH R11
C1 THROUGH C12, C40 THROUGH C68, C89
D2, D3, D4
IC1 THROUGH IC9
Q1, Q2, Q5, Q6

NOTES

1. ALL RESISTORS 1% 1/4W UNLESS OTHERWISE STATED
2. AGND POINTS ON R60, R61 TO BE TAKEN DIRECTLY TO E1p9, E1p10



SPARE GATES

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REV	R No	BY	DATE
01	P23	SRM	14MAR89

TITLE
SCHEMATIC
ANALOG
BOARD

ALL RESISTANCES IN OHMS
ALL CAPACITANCES IN FARADS

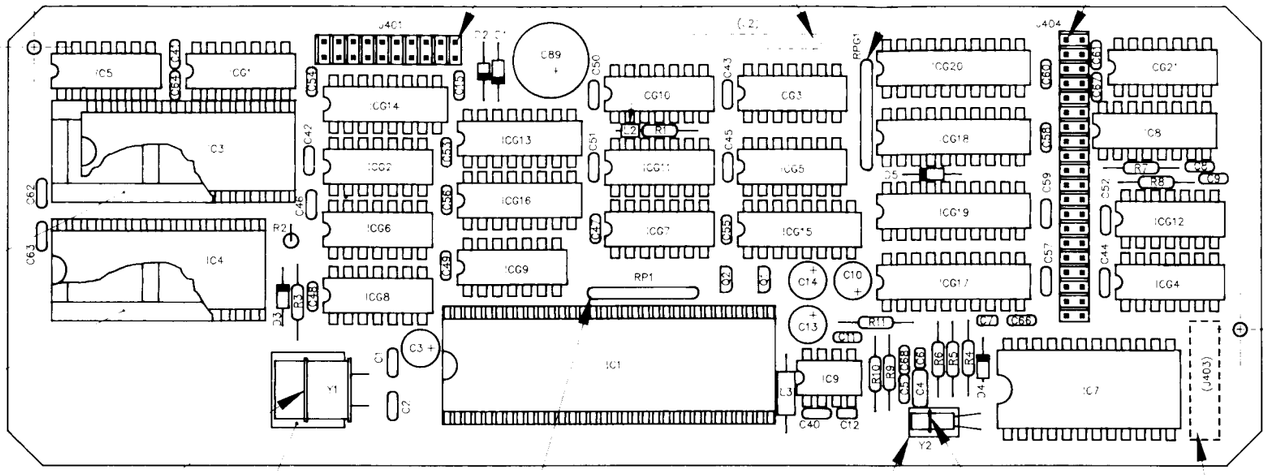
DRAWN	CHECKED	APPD
STRUAN	R.F.	G.A.T.
DATE	DATE	DATE
6JUN88	2JAN89	2JAN89
SHEET	USED ON	
2 OF 2	515	

NOVAMETRIX
MEDICAL SYSTEMS LTD.
A SUBSIDIARY OF NOVAMETRIX MEDICAL SYSTEMS INC.

PART NUMBER

SIZE	DRG. No.	CODE	REV
D	2288	03	01

PROJECTION



PIN 1

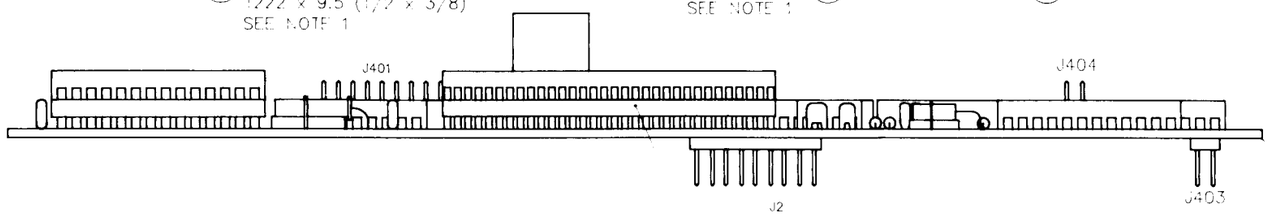
(57) 2 PL.

(14) 2 PL. 1222 x 9.5 (1/2 x 3/8) SEE NOTE 1

9.5 x 5 (3/8 x 3/16) (14) REF. SEE NOTE 1

(57) REF.

PIN 1



(21)

NOTES
1. ITEM 14 TO BE CUT, WHERE NECESSARY, TO GIVEN DIMENSIONS
2. L2 TO BE FITTED ON, TO LEG OF R1 AS SHOWN.

P.N.O.	DESCRIPTION	REFERENCE
472030	10K 1 4W 1%	R3,8
472041	1K 1 4W 1%	R4
472062	150K 1 4W 1%	R5
470081	5.6M 1 4W 10%	R6
472000	10 OHM 1 4W 1%	R7
472003	100 OHM 1 4W 1%	R1,2,9
470021	56 OHM 1 4W 10%	R10
472204	1 OHM 1 4W 1%	R11
474076	100K 7 RES 8 PIN - 1 COMMON	RPG1,RP1
153012	22pF CERAMIC	C1,2
152072	10uF 50V ELECTROLYTIC RADIAL 1SP	C3
154054	.0068uF 200V 10% 1SP	C4
153006	47pF 63V CERAMIC 1SP	C5
153013	33pF CERAMIC	C6,7
153051	0.22uF 50V 20% 0.1 SP. MULTI CER	C11
152073	100uF 6.3V ELECTROLYTIC RADIAL 1SP	C10,C13,C14
153003	.01uF CERAMIC 1SP	C12
154016	.1uF CERAMIC .1SP	C8,9,15,40 - 64,66,67,68
152070	1000uF 10V 20% ELECTROLYTIC RADIAL 2SP	C89
481501	SILICON SIGNAL 1N4148	D1,3,4,5
481534	BAT85 SCHOTTKY MINIATURE	D2
230015	9.216MHz XTAL	Y1
230016	32.768KHz XTAL	Y2
486285	HD64180R1P6 HIGH INTEGRATION CPU	IC1
486625	74HC32 QUAD 2 I/P OR GATE	ICG1,ICG3,ICG21,IC5
486675	74HC14 HEX SCHMITT INVERTERS	ICG2
486289	4025BCN TRIPLE 3 I/P NOR GATE	ICC4,ICG5
486286	74HC10 TRIPLE 3 I/P NAND GATE	ICG6
486642	74HC04 HEX INVERTERS	ICG7
486671	74HC21 DUAL 4 I/P AND	ICG8
486290	4072B DUAL 4 I/P OR GATE	ICG9
486676	74HC74 DUAL D-TYPE LATCHES	ICG10,ICG11
486648	4024B 7 STAGE RIPPLE COUNTER	ICG12
486604	4040B BINARY COUNTER	ICG13
486260	4017B DECADE COUNTER/DIVIDER	ICG14,ICG16
486651	74HC138 3 TO 8 LINE DECODER	ICG15
486680	74HC573 OCTAL D-TYPE LATCHES	ICG17
486288	74HC541 OCTAL 3 STATE BUFFERS	ICG18
486287	74HC245 OCTAL BUS TRANCEIVER	ICG19
486628	74HC244 OCTAL 3 STATE BUFFERS	ICG20
9671-07	PROGRAM,EPROM ASSY. MODEL 515	IC3
486256	HM62256-LP12 32K STATIC RAM	IC4
486699	HD146818 REAL TIME CLOCK/RAM	IC7
486255	SN76496N TONE GENERATOR	IC8
487061	TBA820M AUDIO AMP	IC9
483011	PNP ZTX214C	Q1,2
212501	20 PIN HEADER D.I.L. (210006)	J401
211914	9 PIN HEADER S.I.L.	J2
210097	16 PIN HEADER D.I.L. (210006)	J403
213401	40 PIN HEADER D.I.L. (210006)	J404
180011	FERRITE SLEEVE SHIELD	L3
180012	FERRITE SLEEVE SHIELD	L2

FOR EXPLANATION OF DIMENSIONING AND SYMBOLS SEE BS308

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NO.	REVISION	BY	DATE
REF.	P23	S.T.V.	2/NOV/89

DIMS. IN mm (") DO NOT SCALE

TOLERANCES UNLESS OTHERWISE STATED

DEC

ANG

363

TITLE

SHEET 1 OF 1

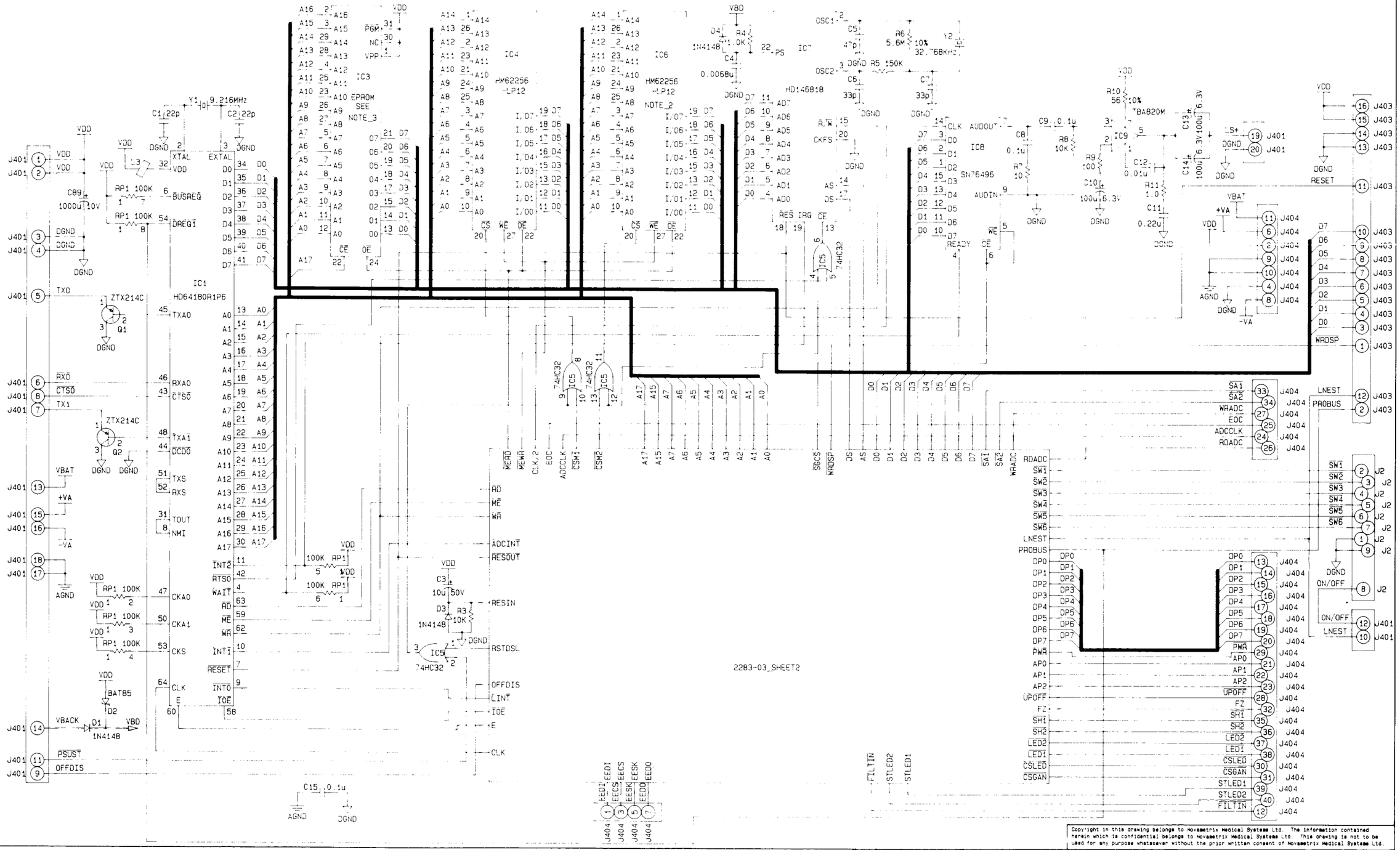
MATERIAL

DRAWN	CHECKED	APPROVED
S.T.V.	R.F.	S.A.T.
DATE 2/NOV/89	DATE 20.JAN.89	DATE 20.JAN.89

NOVAMETRIX MEDICAL SYSTEMS LTD.
A SUBSIDIARY OF NOVAMETRIX MEDICAL SYSTEMS INC.

PART NUMBER

SCALE 2:1	USED ON 515	SIZE A3	DRG. NO. 22843	CODE 47	REV. 23


IC1
HD64180R1P6
IC3
EPROM
SEE
NOTE_3
IC4
HM62256
-LP12
IC6
HM62256
-LP12
NOTE_2
IC7
HD146818
IC8
SN76496
IC9
TBA820M
Y1
9.216MHz
C1 22p
C2 22p
C4
0.0068u
C5
47p
C6
33p
C7
33p
R4
11.0K
R5 150K
R6
5.6M 10%
32.768KHz
Y2
C89
1000u 10V
RP1 100K
BUSREQ
DREG1
Q1
ZTX214C
Q2
ZTX214C
BAT85
D2
1N4148
D1
1N4148
D3
1N4148
R3
10K
IC5
74HC32
C3
10u 50V
C8
0.1u
C9 0.1u
R7
10
R8
10K
R9
100
R10
56 10%
C10
100u 6.3V
C11
0.22u
C12
0.01u
C13
C14
100u 6.3V
R11
1.0
C15 0.1u
J401
J403
J404
J2
J401
J401
J401

POWER SUPPLIES				
IC	TYPE	PINS	VBACK	DGND
1	4013	14	14	7
3	4093	14	14	7

NOTE
ALL RESISTORS TO BE 1/4W 1% UNLESS OTHERWISE STATED

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REV	R No	BY	DATE
01	P23	SRM	15MAR89

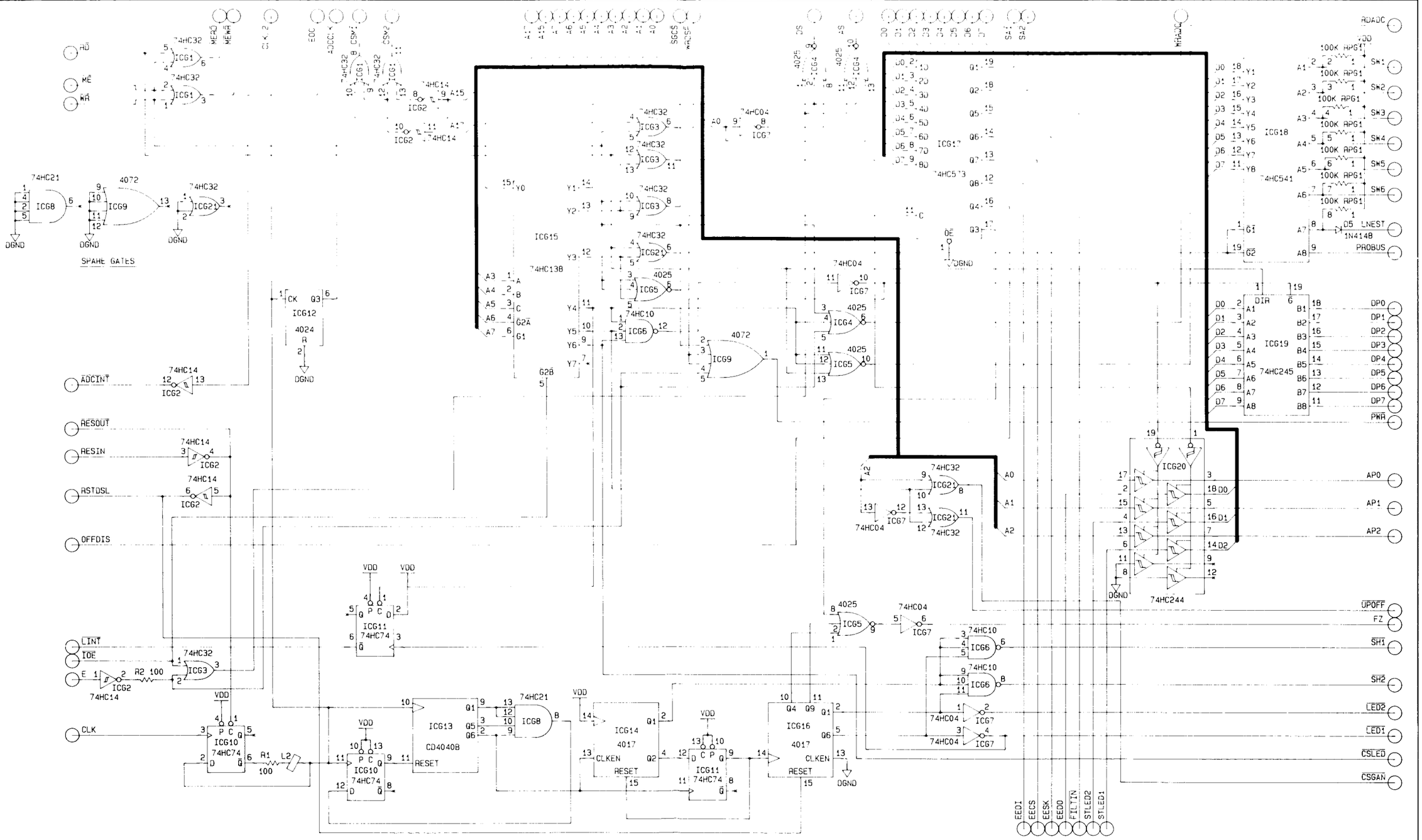
TITLE
SCHEMATIC
P.S.U. BOARD

ALL RESISTANCES IN OHMS
ALL CAPACITANCES IN FARADS

DRAWN	CHECKED	APPD
STRUAN	RJF	GLM
DATE 1DEC88	DATE 8FEB89	DATE 8FEB89
SHEET	USED ON 515	

NOVAMETRIX
MEDICAL SYSTEMS LTD.
A SUBSIDIARY OF NOVAMETRIX MEDICAL SYSTEMS INC.
PART NUMBER

SIZE	DRG. No.	CODE	REV
D	2503	03	01



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REV	R No	BY	DATE
01	P23	SRM	14MAR89

TITLE

SCHEMATIC
DIGITAL
BOARD

ALL RESISTANCES IN OHMS
ALL CAPACITANCES IN FARADS

DRAWN	CHECKED	APPROVED
STRUAN	R.F.	G.A.T.
DATE 16FEB88	DATE 2JAN89	DATE 2JAN89
SHEET 2 OF 3	USED ON 515	

NOVAMETRIX
MEDICAL SYSTEMS LTD.
A SUBSIDIARY OF NOVAMETRIX MEDICAL SYSTEMS INC

PART NUMBER

SIZE	DRG No	CODE	REV
D	2283	03	01

		POWER SUPPLIES							DECOUPLING			
IC	TYPE	PINS	VBD	+VA	AGND	-VA	VDD	DGND	REF	VALUE	FROM	TO
1	HD64180R1P6	64						33, 1	C40	0.1u	VDD	DGND
2												
3	SEE NOTE 3	32					32	16	C62	0.1u	VDD	DGND
4	HM62256LP12	28	28					14	C63	0.1u	VBD	DGND
5	74HC32	14	14					7	C64	0.1u	VBD	DGND
6	HM62256LP12	28	28					14	C65	0.1u	VBD	DGND
7	HD146818	24	24					12	C66	0.1u	VBD	DGND
8	SN76496	16					16	8	C67	0.1u	VDD	DGND
9	TBA820M	8					6	4	C68	0.1u	VDD	DGND
G1	74HC32	14					14	7	C41	0.1u	VDD	DGND
G2	74HC14	14					14	7	C42	0.1u	VDD	DGND
G3	74HC32	14					14	7	C43	0.1u	VDD	DGND
G4	4025	14					14	7	C44	0.1u	VDD	DGND
G5	4025	14					14	7	C45	0.1u	VDD	DGND
G6	74HC10	14					14	7	C46	0.1u	VDD	DGND
G7	74HC04	14					14	7	C47	0.1u	VDD	DGND
G8	74HC21	14					14	7	C48	0.1u	VDD	DGND
G9	4072	14					14	7	C49	0.1u	VDD	DGND
G10	74HC74	14					14	7	C50	0.1u	VDD	DGND
G11	74HC74	14					14	7	C51	0.1u	VDD	DGND
G12	4024	14					14	7	C52	0.1u	VDD	DGND
G13	CD4040B	16					16	8	C53	0.1u	VDD	DGND
G14	4017	16					16	8	C54	0.1u	VDD	DGND
G15	74HC138	16					16	8	C55	0.1u	VDD	DGND
G16	4017	16					16	8	C56	0.1u	VDD	DGND
G17	74HC573	20					20	10	C57	0.1u	VDD	DGND
G18	74HC541	20					20	10	C58	0.1u	VDD	DGND
G19	74HC245	20					20	10	C59	0.1u	VDD	DGND
G20	74HC244	20					20	10	C60	0.1u	VDD	DGND
G21	74HC32	14					14	7	C61	0.1u	VDD	DGND

LAST USED REFERENCES

RESISTORS	R11	RPG1
CAPACITORS	C89	
DIODES	D5	
RESISTOR PACKS	RP1	
TRANSISTORS	Q2	
INTEGRATED CIRCUITS	IC9	IC621

NOT USED

C13 THROUGH C39, C69 THROUGH C88
IC2

NOTES

1. ALL RESISTORS 1% 1/4W UNLESS OTHERWISE STATED
2. IC6 IS OPTIONAL. C65 ONLY FITTED WITH IC6.
3. IC3 IS EITHER HN27C1016-20 OR HN27C512-2
   WHEN FITTING HN27C1016-20 IN SKT FIT IN PINS 1 TO 32
   WHEN FITTING HN27C512-2 IN SKT FIT IN PINS 3 TO 30

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01	PPR	SHM 14MAR89	
ALL	R.M.C	BY	DATE

TITLE

ALL RESISTANCES IN OHMS
ALL CAPACITANCES IN FARADS

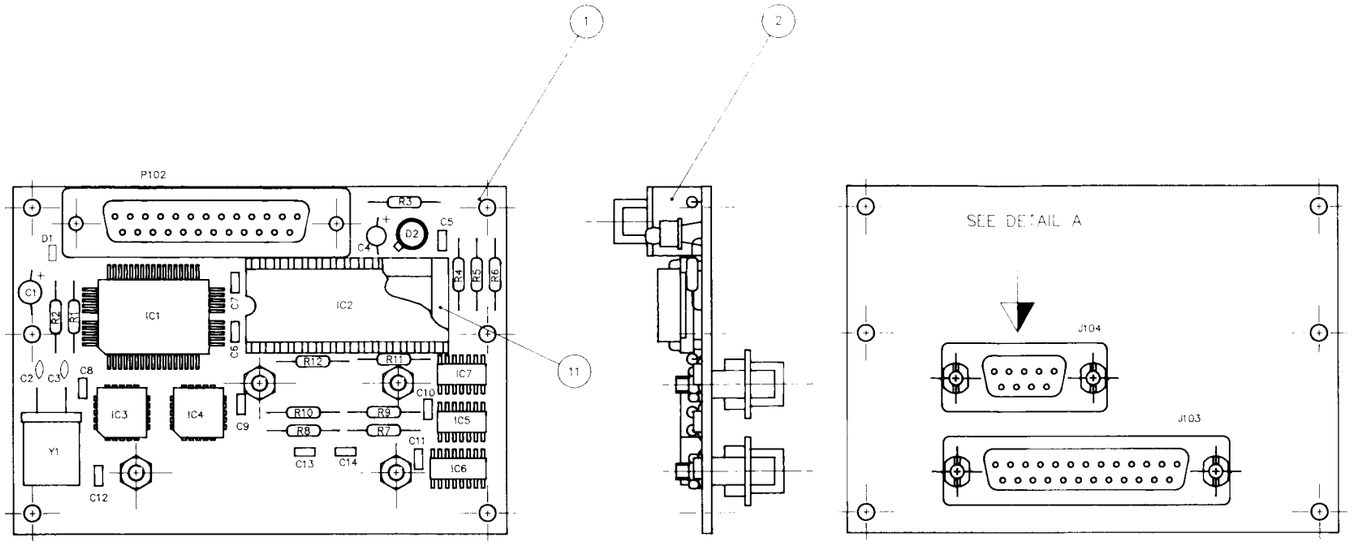
DRAWN	CHECKED	APPD
S.T.R.J.R.	R.P.P.	G.A.T.
DATE 9.JAN.89	DATE 21.JAN.89	DATE 21.JAN.89
SHEET 1 OF 1	USED ON P.C.B.	

NOVAMETRIX
MEDICAL SYSTEMS LTD.
A SUBSIDIARY OF NOVAMETRIX MEDICAL SYSTEMS INC.

PART NUMBER

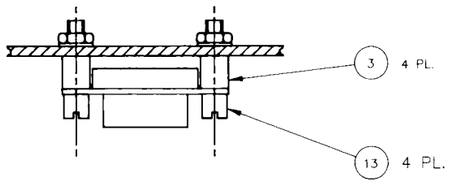
SIZE	DRG. NO.	CODE	REV.
A	2283	03	01

PROJECTION



P. NO.	DESCRIPTION	REFERENCE
152056	4.7uF 16V TANTALUM .2" PITCH	C4
152062	10uF 10V TANTALUM .2" PITCH	C1
153012	22pF	C2,3
154063	0.1uF 63V 10% SURFACE MOUNT	C5 – C14
211915	9 PIN D TYPE RECEPT.	J104
212650	25 PIN D TYPE RECEPT.	J103
212659	25 PIN D TYPE PLUG	P102
230012	CRYSTAL VF246 2.4576MHZ .2 SPACING	Y1
472187	CARBON 4.75 OHM 1/4W 1%	R3
472030	10K OHM 1/4W 1%	R1,2,5,6,8,10,12
472039	15K OHM 1/4W 1%	R4
472046	33.2K OHM 1/4W 1%	R7,9,11
481000	ZENER ICL8069CCQ 1.2V TEMP. V REF. .005%/C	D2
481538	BAS16 PLANAR EPITAXIAL ri S SURFACE MOUNT	D1
486029	HD63B03RF CMOS MPU SURFACE MOUNT	IC1
486262	HN27C64G-30 ERASABLE PROG. CMOS ROM	IC2
486291	74HCT00M QUAD 2 INPUT NAND GATE SURF. MT.	IC5
486292	74HCT138M 3 TO 8 LINE DECODER SURF. MT.	IC6
486775	LM324M QUAD OP AMP SURFACE MOUNT	IC7
486776	AD7528JP DUAL 8 BIT BUFF MULT DAC SURF. MT.	IC3,4

DETAIL A
TO SHOW TYPICAL MOUNTING
DETAILS FOR J103 AND J102



FOR EXPLANATION OF DIMENSIONING AND SYMBOLS SEE BS308

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REV	R No	BY	DATE

DIMS. IN mm. (in.) DO NOT SCALE
TOLERANCES EXCEPT WHERE OTHERWISE STATED
mm.
in.
deg.

TITLE: ASSEMBLY RS232 ANALOG BOARD

SHEET	MATERIAL		
1 OF 1			
DRAWN	CHECKED	APPROVED	
S.T.M.	G.A. Thomas	Mario	
DATE	DATE	DATE	
21FEB89	24/Feb/89	24 FEB 89	
SCALE		USED ON	
2:1		515	

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PART NUMBER

SIZE	DRG. NO.	CODE	REV.
D	2289	01	00

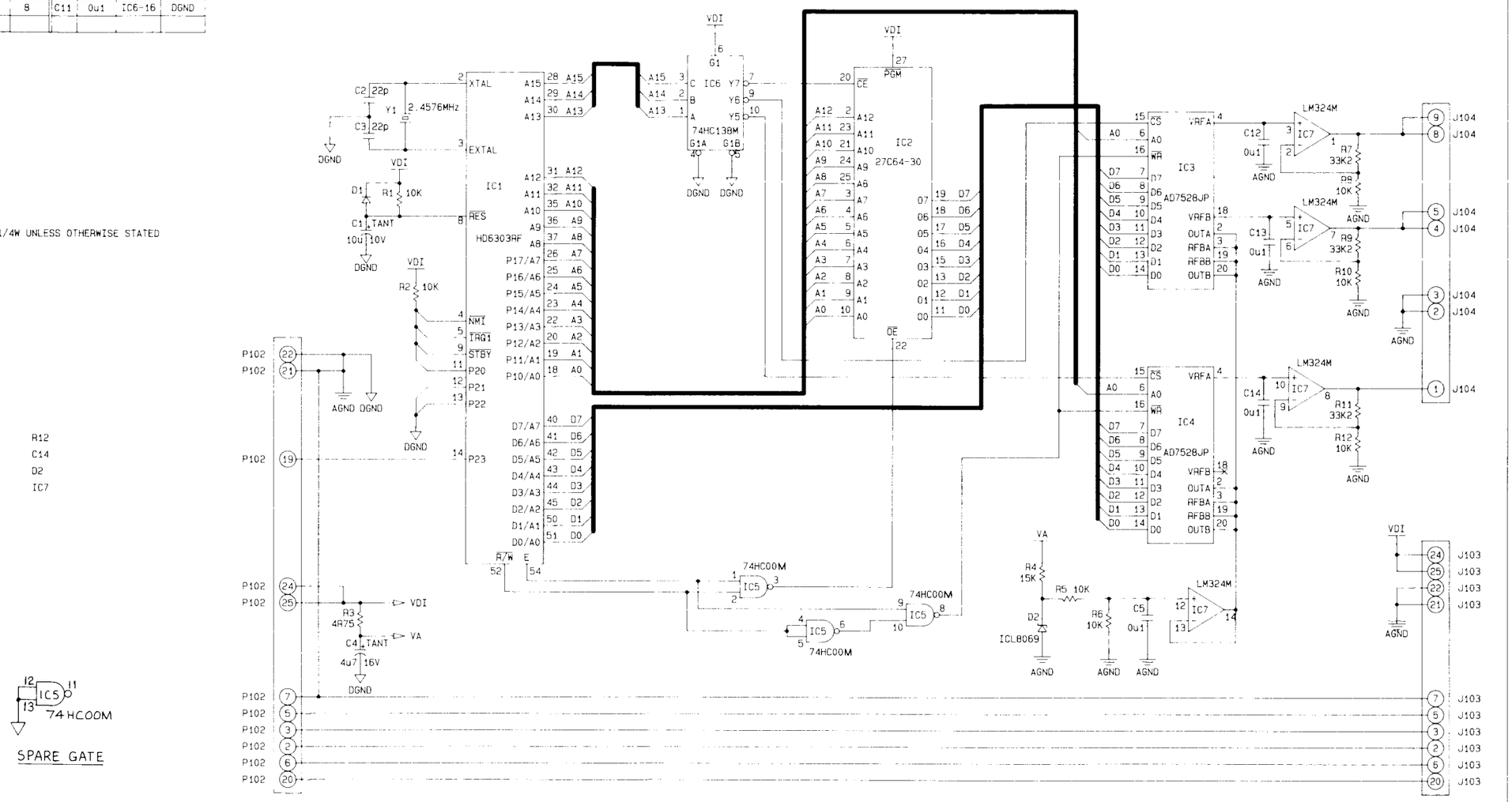
POWER SUPPLIES						
IC	TYPE	PINS	+VA	+VDI	AGND	DGND
1	HD6303RF	54		27		1
2	27C64-30	28		1,28		14
3	AD7528JP	20	17		1	5
4	AD7528JP	20	17		1	5
5	74HC00M	14		14		7
6	74HC138M	16		16		8
7	LM324M	14	4		11	

DECOUPLING			
REF	VALUE	FROM	TO
C6	0u1	IC1-7	DGND
C7	0u1	IC2-28	DGND
C8	0u1	IC3-17	DGND
C9	0u1	IC4-17	DGND
C10	0u1	IC5-14	DGND
C11	0u1	IC6-16	DGND

NOTE
ALL RESISTORS 1% 1/4W UNLESS OTHERWISE STATED

LAST USED REFERENCES

RESISTORS	R12
CAPACITORS	C14
DIODES	D2
INTEGRATED CIRCUITS	IC7



SPARE GATE

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REV	R No.	BY	DATE

TITLE
SCHEMATIC
RS-232
ANALOG BOARD

ALL RESISTANCES IN OHMS
ALL CAPACITANCES IN FARADS

DRAWN	CHECKED	APPD
STRJAN		
DATE 6MAY88	DATE 24/FEB/89	DATE 24/FEB/89

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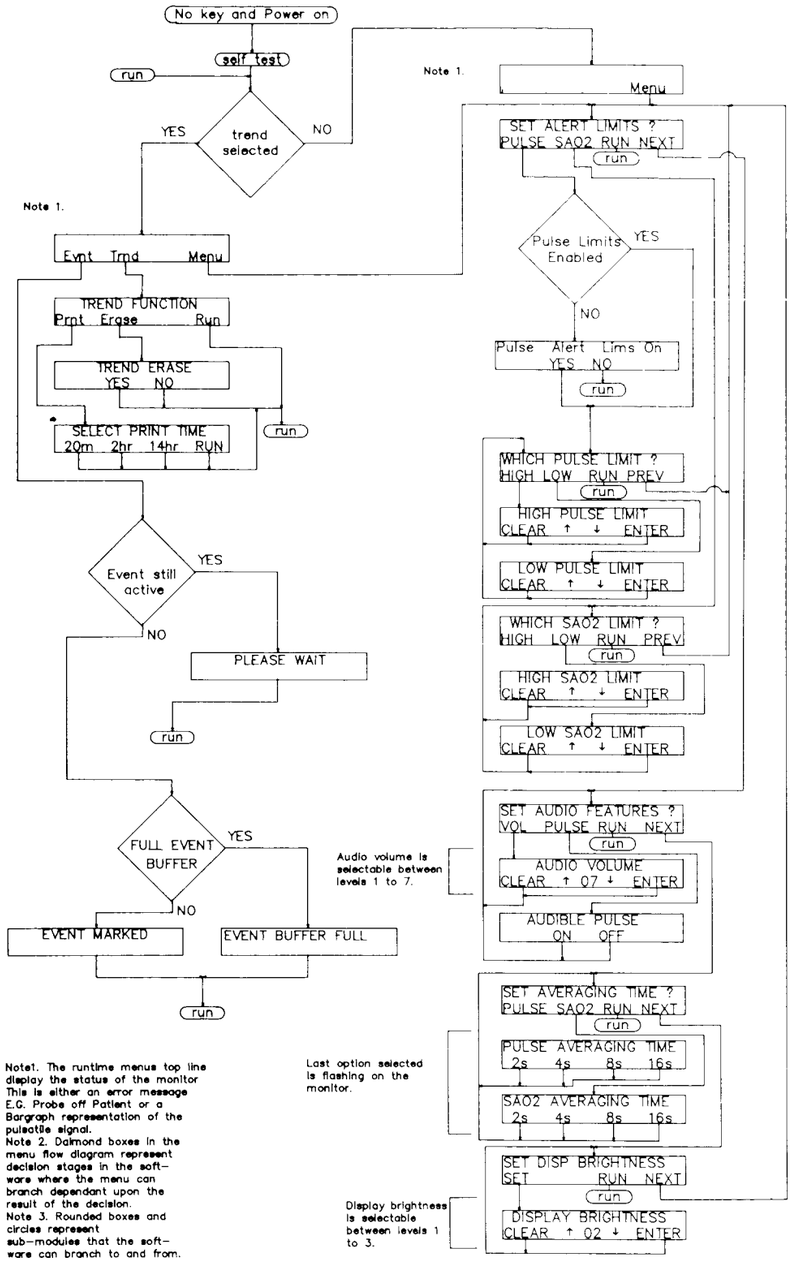
PART NUMBER

SHEET	USED ON	SIZE	DRG No.	CODE	REV
5:5		D	2289	03	00

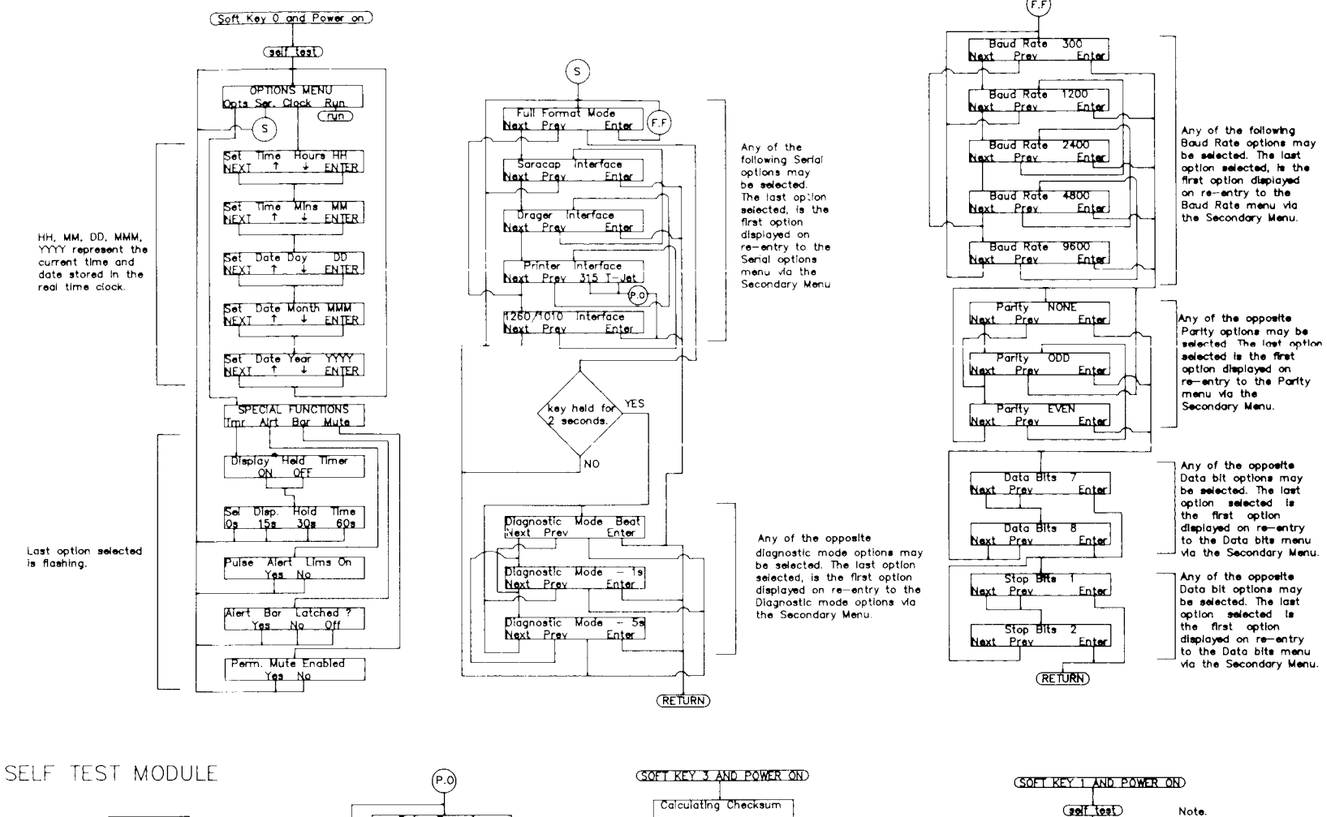
MAIN MENU ENTRY (run)



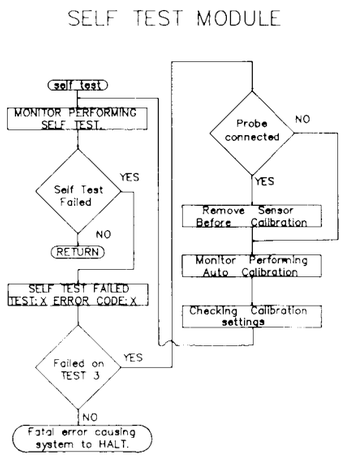
Note1. The runtime menus top line display the status of the monitor This is either an error message E.G. Probe off Patient or a Bargraph representation of the pulsatile signal.
Note 2. Daimond boxes in the menu flow diagram represent decision stages in the soft-ware where the menu can branch dependant upon the result of the decision.
Note 3. Rounded boxes and circles represent sub-modules that the soft-ware can branch to and from.

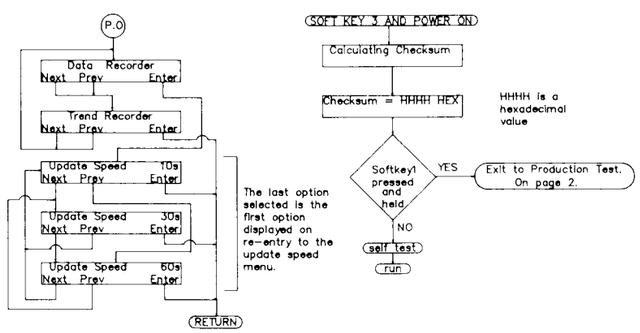
PROJECTION

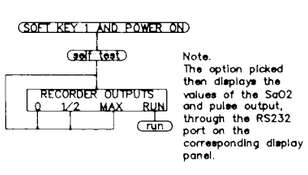
SECONDARY MENU STRUCTURE

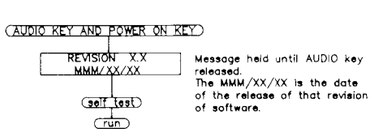

Soft Key 0 and Power on
self test
OPTIONS MENU
Opts Ser. Clock Run
run
S
Set Time Hours HH
NEXT ↑ ↓ ENTER
Set Time Mins MM
NEXT ↑ ↓ ENTER
Set Date Day DD
NEXT ↑ ↓ ENTER
Set Date Month MMM
NEXT ↑ ↓ ENTER
Set Date Year YYYY
NEXT ↑ ↓ ENTER
SPECIAL FUNCTIONS
Tmr Alrt Bar Mute
Display Hold Timer
ON OFF
Sel Disp. Hold Time
0s 15s 30s 60s
Pulse Alert Lims On
Yes No
Alert Bar Latched ?
Yes No Off
Perm. Mute Enabled
Yes No
HH, MM, DD, MMM, YYYY represent the current time and date stored in the real time clock.
Last option selected is flashing.
S
Full Format Mode
Next Prev Enter
F.F
Saracap Interface
Next Prev Enter
Drager Interface
Next Prev Enter
Printer Interface
Next Prev 315 T-Jet
P.O
1260/1010 Interface
Next Prev Enter
key held for 2 seconds.
YES
NO
Diagnostic Mode Beat
Next Prev Enter
Diagnostic Mode - 1s
Next Prev Enter
Diagnostic Mode - 5s
Next Prev Enter
RETURN
Any of the following Serial options may be selected. The last option selected, is the first option displayed on re-entry to the Serial options menu via the Secondary Menu
Any of the opposite diagnostic mode options may be selected. The last option selected, is the first option displayed on re-entry to the Diagnostic mode options via the Secondary Menu.
F.F
Baud Rate 300
Next Prev Enter
Baud Rate 1200
Next Prev Enter
Baud Rate 2400
Next Prev Enter
Baud Rate 4800
Next Prev Enter
Baud Rate 9600
Next Prev Enter
Parity NONE
Next Prev Enter
Parity ODD
Next Prev Enter
Parity EVEN
Next Prev Enter
Data Bits 7
Next Prev Enter
Data Bits 8
Next Prev Enter
Stop Bits 1
Next Prev Enter
Stop Bits 2
Next Prev Enter
RETURN
Any of the following Baud Rate options may be selected. The last option selected, is the first option displayed on re-entry to the Baud Rate menu via the Secondary Menu.
Any of the opposite Parity options may be selected. The last option selected is the first option displayed on re-entry to the Parity menu via the Secondary Menu.
Any of the opposite Data bit options may be selected. The last option selected is the first option displayed on re-entry to the Data bits menu via the Secondary Menu.
Any of the opposite Data bit options may be selected. The last option selected is the first option displayed on re-entry to the Data bits menu via the Secondary Menu.

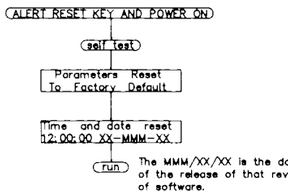
SELF TEST MODULE






SOFT KEY 1 AND POWER ON
self test
RECORDER OUTPUTS
0 1/2 MAX RUN
run
Note.
The option picked then displays the values of the SaO2 and pulse output, through the RS232 port on the corresponding display panel.


AUDIO KEY AND POWER ON KEY
REVISION XX
MMM/XX/XX
self test
run
Message held until AUDIO key released.
The MMM/XX/XX is the date of the release of that revision of software.


ALERT RESET KEY AND POWER ON
self test
Parameters Reset To Factory Default
Time and date reset
12:00:00 XX-MMM-XX
run
The MMM/XX/XX is the date of the release of that revision of software.

SOFT KEY 2 AND POWER ON PRODUCES DISPLAY TEST FOR 5 SECONDS WHICH IS FOLLOWED BY NMI RESET

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REV	R No	BY	DATE

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mm.
in.
deg.

TITLE: 515 Menu Structure.

SHEET	MATERIAL
1 OF 3	

DRAWN	CHECKED	APPROVED
Merecki	AC Kerse9	SA Young
DATE 2FEB89	DATE 21-Feb-89	DATE 21/Feb/89

SCALE

USED ON	SIZE	DRG. NO.	CODE	REV.
515	D	9671	53	09

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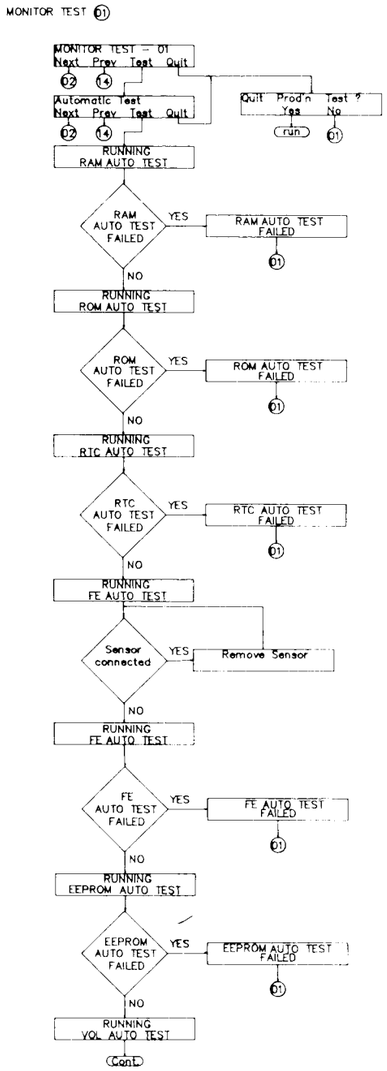
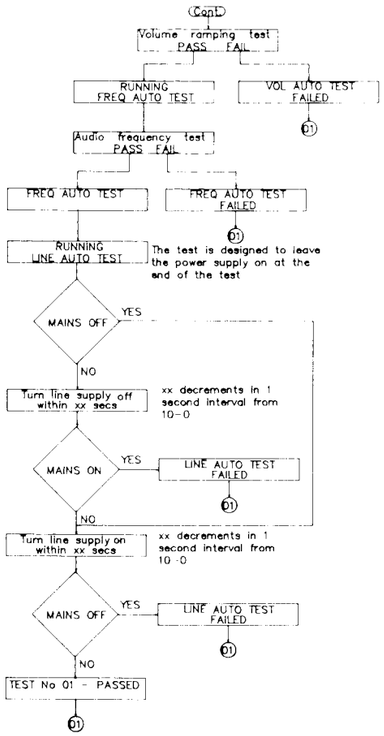
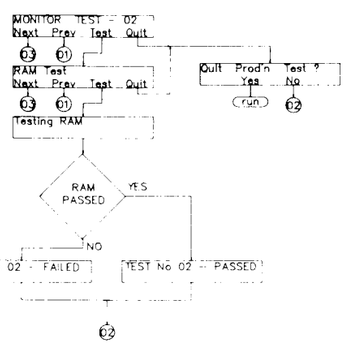
PART NUMBER

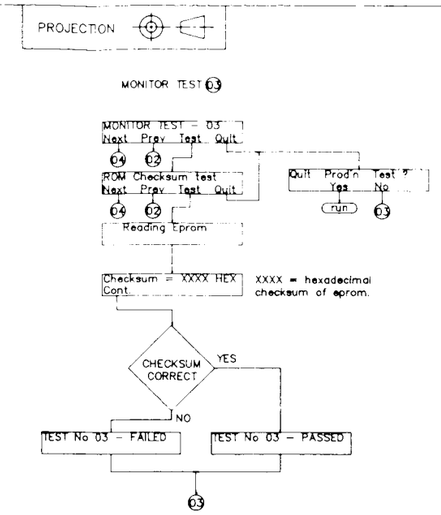
Production Test

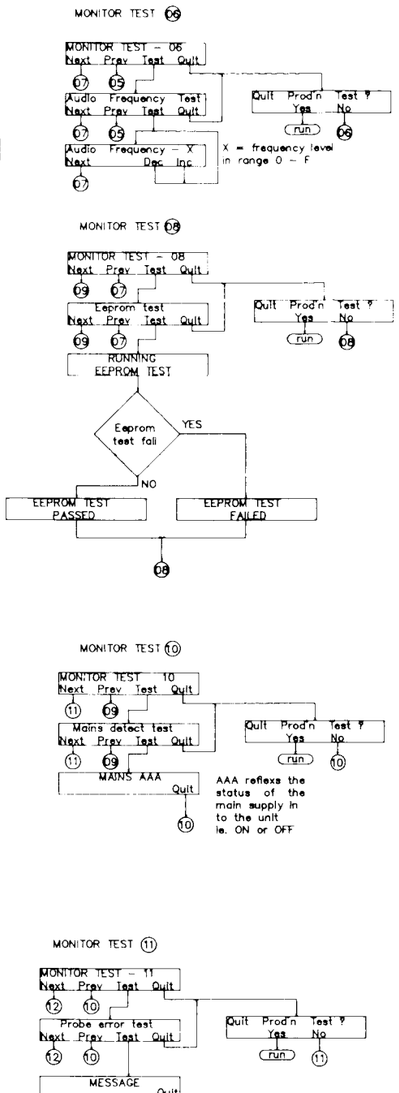
Production test starts at monitor test 1

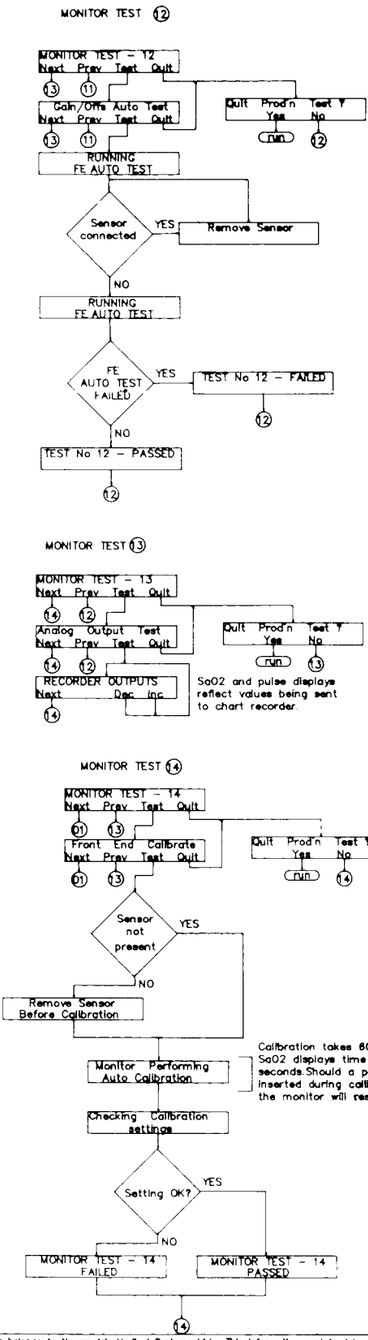












Tests nine and seven are on page 3.

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mm.
in.
deg.

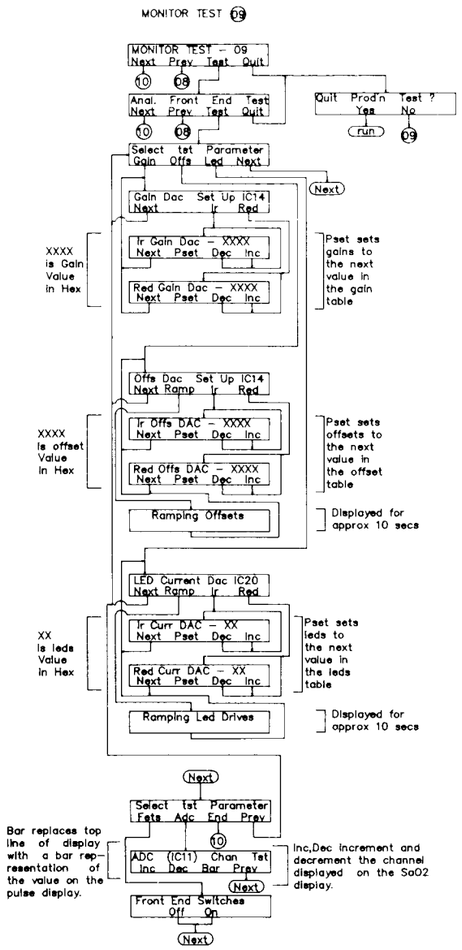
REV. P.No. BY DATE

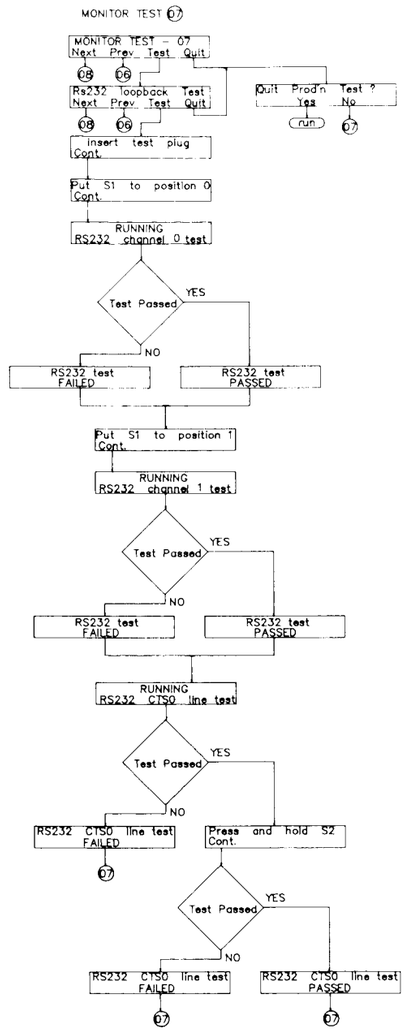
TITLE: 515 Menu Structure.

SHEET 2 OF 3		MATERIAL	
DRAWN Merecki	CHECKED [illegible]	APPROVED [illegible]	NOVAMETRIX MEDICAL SYSTEMS LTD. A SUBSIDIARY OF NOVAMETRIX MEDICAL SYSTEMS INC.
DATE 2FEB89	DATE 21-Feb-89	DATE [illegible]	PART NUMBER
SCALE	USED ON 515	SIZE D	DRG. NO. 9671 / CODE 53 / REV. 09

Production Test Cont.

PROJECTION


MONITOR TEST 09
MONITOR TEST - 09
Next Prev Test Quit
10
08
Anal. Front End Test
Next Prev Test Quit
Quit Prod'n Test ?
Yes No
run
09
Select tst Parameter
Gain Offs Led Next
Next
Gain Dac Set Up IC14
Next Ir Red
Ir Gain Dac - XXXX
Next Pset Dec Inc
Red Gain Dac - XXXX
Next Pset Dec Inc
XXXX is Gain Value in Hex
Pset sets gains to the next value in the gain table
Offs Dac Set Up IC14
Next Ramp Ir Red
Ir Offs DAC - XXXX
Next Pset Dec Inc
Red Offs DAC - XXXX
Next Pset Dec Inc
XXXX is offset Value in Hex
Pset sets offsets to the next value in the offset table
Ramping Offsets
Displayed for approx 10 secs
LED Current Dac IC20
Next Ramp Ir Red
Ir Curr DAC - XX
Next Pset Dec Inc
Red Curr DAC - XX
Next Pset Dec Inc
XX is leds Value in Hex
Pset sets leds to the next value in the leds table
Ramping Led Drives
Displayed for approx 10 secs
Next
Select tst Parameter
Fets Adc End Prev
10
ADC (IC11) Chan Tst
Inc Dec Bar Prev
Next
Front End Switches
Off On
Next
Bar replaces top line of display with a bar representation of the value on the pulse display.
Inc,Dec increment and decrement the channel displayed on the So02 display.



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REV	R No	BY	DATE

DIMS. IN mm. (In.) DO NOT SCALE

TOLERANCES EXCEPT WHERE OTHERWISE STATED

mm.

In.

deg.

TITLE: 515 Menu Structure.

SHEET 3 OF 3		MATERIAL	
DRAWN Merecki	CHECKED AE Mersey	APPROVED SA Wood	
DATE 2FEB89	DATE 21-Feb-89	DATE 21/2/89	
SCALE		USED ON 515	

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PART NUMBER

SIZE	DRG. NO.	CODE	REV.
D	9671	53	09